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PROCEEDINGS

264

OF THE

ASIATIC SOCIETY OF BENGAL,

EDITED BY

THE HONORARY SECRETARIES.



JANUARY TO DECEMBER,

1873.



CALCUTTA:

PRINTED BY C. B. LEWIS, BAPTIST MISSION PRESS.

1869.

JOURNAL

OF THE

ASIATIC SOCIETY.



No. I.—1873.

ON DIFFERENTIAL GALVANOMETERS,—
by LOUIS SCHWENDLER.

(Continued from page 152, Vol. XLI, Part II, 1872.)*

The first part of this investigation concluded with the following question :

What general condition must be fulfilled in the construction of any differential galvanometer in order to make a simultaneous maximum possible with respect to an alteration of external resistance in either of the differential branches ?

To answer this question, it will be necessary to remember, that the condition of a simultaneous maximum sensitiveness at or near balance was expressed by 3 equations, namely,—

$$\frac{(w-g)(w'+g')+f(w+w'+g'-g)}{p(g-w)g'} = \frac{2(g+w+f)}{2\sqrt{g}\sqrt{g'}-p(g+w)} \dots \text{II}$$

$$\frac{(w'-g')(w+g)+f(w+w'+g-g')}{\frac{(g'-w')}{p}g} = \frac{2(g'+w'+f)}{2\sqrt{g}\sqrt{g'}-\frac{g'+w'}{p}} \dots \text{II'}$$

and

$$g' + w' - p \frac{\sqrt{g'}}{\sqrt{g}} (g + w) = 0 \dots \text{I}$$

g and g' being the resistances of the two differential coils, w and w' the two resistances at which balance actually arrives, f the total resistance in the battery branch, and p an absolute number expressing what was termed the

Read before the Asiatic Society of Bengal, 6th March, 1872.

"mechanical arrangement" of the differential galvanometer under consideration.

By these three equations, which are independent of each other, g , g' and p can be expressed in terms of w , w' and f .

By equation I we have at or very near balance :

$$p = \frac{g' + w'}{g + w} \cdot \frac{\sqrt{g}}{\sqrt{g'}} \text{ which value substituted in equations II and II'}$$

gives :

$$\frac{(w - g)(w' + g') + f(w + w' + g' - g)}{(g' + w')(g - w)g'} = \frac{2(g + w + f)}{(g' - w')(g + w)} \dots \text{II}$$

and

$$\frac{(w' - g')(w + g) + f(w + w' + g - g')}{(g + w)(g' - w')g} = \frac{2(g' + w' + f)}{(g - w)(g' + w')} \dots \text{II'}$$

and from these two equations g and g' may be developed.

This is best done by subtracting equation II from equation II' when after reduction we get :—

$$(w'g - wg')(w'g + wg' + gg' + ww') = -f(g + g' + w + w')(w'g - wg') \quad \text{III}$$

Now it must be remembered, that with respect to our physical problem, f , w , w' , g and g' represent nothing else, but electrical resistances, and that they have, therefore, to be taken in any formula as quantities of the same sign (say positive).

Consequently the above equation III would contain a mathematical impossibility (a positive quantity equal to a negative quantity), whenever the common factor $w'g - wg'$ is different from zero.

In other words equation III can only be fulfilled if we always have :

$$w'g - wg' = 0 \dots \text{IV}$$

This simple relation between the resistances at which balance arrives and the resistances of the two differential coils, expresses not only the necessary and sufficient condition under which a simultaneous maximum sensitiveness can exist, but it also affords an easy means of getting at once those special values of g , g' and p , which only solve the physical problem.

Substituting the value of either g or g' , as given by equation IV in equations II and II' and developing g and g' we have :

$$*g = -\frac{1}{3} \left(w + f \frac{(w + w')}{2w'} \right) + \frac{2}{3} \sqrt{w^2 + \frac{w}{w'}(w + w')f + \frac{(w + w')^2}{16w^2}f^2} \dots a.$$

$$*g' = -\frac{1}{3} \left(w' + f \frac{(w + w')}{2w} \right) + \frac{2}{3} \sqrt{w'^2 + \frac{w'}{w}(w + w')f + \frac{(w + w')^2}{16w'^2}f^2} \dots b.$$

the negative signs of the square roots having been omitted since they would

obviously make g and g' negative, values which cannot solve the physical question.—

Further, if we introduce the ratio

$\frac{g'}{g} = \frac{w'}{w}$, given by equation IV, into equation I, and develope p we get :

$$p^2 = \frac{w'}{w}$$

This latter expression shows the very simple relation which must exist between the *mechanical arrangement* of any differential galvanometer and the two resistances at which balance is arrived at, in order to make a simultaneous maximum sensitiveness possible.

Thus if the ratio of the two resistances at which balance arrives is fixed, the mechanical arrangement p cannot be chosen arbitrarily, but must be identical with this ratio. This is in fact the answer to the question put at the beginning of this paper.

However, the meaning of this result will be made even still clearer if we revert to equation I, by which we have

$$p \frac{\sqrt{g'}}{\sqrt{g}} = \frac{g' + w'}{g + w} = C \dots\dots\dots \text{I.}$$

expressing the ratio between the total resistances in the two differential branches, when balance is established, and which ratio is generally known under the name *Constant of the Differential Galvanometer*.

Substituting in the above expression I the value of $\frac{g'}{g} = \frac{w'}{w}$ from equation IV we get at once

$$\frac{w'}{w} = C \dots\dots\dots d.$$

and as a second answer to the question put at the beginning of this paper we have therefore :

A simultaneous maximum sensitiveness with respect to an alteration of external resistance in either branch of any differential galvanometer can be obtained only, if the constant of the differential galvanometer is equal to the ratio of the two resistances at which balance arrives, and this clearly necessitates that the resistances of the respective coils to which w and w' belong should stand in the same ratio.

The general problem may now be considered as solved by the following four general expressions :

$$g = -\frac{1}{2} \left(w + f \frac{(w + w')}{2w'} \right) + \frac{1}{2} \sqrt{w^2 + \frac{w}{w'} (w + w') f + \frac{(w + w')^2}{16w^2} f^2} \dots$$

$$g' = \frac{w'}{w} g \dots\dots\dots b.$$

$$p'' = \frac{-}{w} \dots\dots\dots c.$$

$$C = \frac{w'}{w} \dots\dots\dots d.$$

Additional remarks.

In the foregoing it has not been shewn that the values g and g' , expressed by equations a and b , must necessarily correspond to a maximum sensitiveness of the differential galvanometer, because it was clear *à priori*, that the function by which the deflection is expressed is of such a nature that no minimum with respect to g and g' is possible. However, to complete the solution mathematically, the following is a very short proof that the values of g and g' really do correspond to a maximum sensitiveness of the differential galvanometer under consideration.

Reverting to one of the expressions for the deflection a° which any differential galvanometer gives before balance is arrived at, we had :

$$a^\circ \propto K \frac{\sqrt{g}}{N} \Delta \text{ and as the increase of deflection at or near balance is}$$

identical with the deflection itself, and further as the law which binds the resistance of the differential coils to the other resistances in the circuit, in order to have a maximum sensitiveness, is of practical interest only when the needle is at, or very nearly at, balance, we can solve the question at once by making a° a maximum with respect to g and g' , if we only suppose Δ constant and small enough, and as K is known to be independent of g and g' , the deflection a° will be a maximum if $\frac{\sqrt{g}}{N}$ is a maximum for any constant Δ (zero included).

Further we know that $g' = Cg$ which value for g' in N substituted will make the latter a function of g only and consequently $\frac{\sqrt{g}}{N}$ also. We have therefore to deal with a single maximum or minimum, and according to well-known rules we have :

$$\frac{da}{dg} = \frac{N - 2g \frac{dN}{dg}}{2\sqrt{g} N^2} = \frac{U}{V}$$

and

$$\frac{d^2a}{dg^2} = \frac{V \frac{dU}{dg} - U \frac{dV}{dg}}{V^2}$$

but

$$\frac{da}{dg} = 0 \quad \text{it follows that} \quad U = 0$$

$$\therefore \quad \frac{d^2a}{dg^2} = \frac{1}{V} \frac{dU}{dg}$$

Now

$\frac{dU}{dg} = -\left(\frac{dN}{dg} + 2g \frac{d^2N}{dg^2}\right)$, but $\frac{dN}{dg}$ as well as $\frac{d^2N}{dg^2}$ being invariably positive, it follows that $\frac{dU}{dg}$ is invariably negative, and as further V is always positive it follows finally that $\frac{d^2a}{dg^2}$ is always negative, or the value of g obtained by equation $\frac{da}{dg} = 0$ corresponds to a maximum sensitiveness of the differential galvanometer.

In a similar way it can be shewn that the value of g' obtained by equation $\frac{da}{dg} = 0$ corresponds also to a maximum sensitiveness of the differential galvanometer.

This is in fact a second and far more simple solution of the problem. However, it is by no means as general, nor does it adhere as closely to the spirit of analysis as the first more complicated solution.

Effect of Shunts.—It is clear that the introduction of shunts cannot alter the general results as given in equations a , b , c , and d , as long as the shunts are used merely for the purpose of carrying off a fixed quantity of current without in themselves having any direct magnetic action on the needle.

However, to avoid misunderstanding, it is well to remember that in the case of shunts being used, the values to be given to w and w' in the above equations are *not* those at which balance actually arrives, but those at which balance would arrive if no shunts were used, *i. e.*, the resistance at which balance is established when using shunts must be multiplied by the multiplying power of their respective shunts, before they are to be substituted in the equations a , b , c and d .

Mechanical arrangement designed by p.—The condition which must be fulfilled in the construction of any differential galvanometer to make a simultaneous maximum sensitiveness possible was expressed by

$$p^2 = \frac{w'}{w} \dots\dots\dots c.$$

while $p = \frac{m'n'}{m n}$ and it will be now instructive to enquire what special physical meaning equation c has.

By m was understood the magnetic effect of an average convolution (*i. e.* one of average size and mean distance from the magnet acted upon, when the latter is parallel with the plane of the convolutions) in the differential coil of resistance g , when a current of unit strength passes through it. Similarly m' was the magnetic effect of an average convolution in the other differential coil of resistance g' .

Further n and n' were quantities expressed by

$$U = n \sqrt{g}$$

and

$$U' = n' \sqrt{g'}$$

U and U' being the number of convolutions in the two coils g and g' respectively.

Now we will call A half the cross section of the coil g (cut through the coil normal to the direction of the convolutions) and which section, as the wire is to be supposed uniformly coiled, must be uniform throughout.

Thus we have generally

$$\frac{A}{c(q + \delta)} = U$$

wherever the normal cut through the coil is taken.

c is a constant indicating the manner of coiling, either by dividing the cross-section A into squares, hexagons or in any other way, but always supposing that however the coiling of the wire may have been done, it has been done uniformly throughout the coil. (This supposition is quite sufficiently nearly fulfilled in practice because the coiling should always be executed with the greatest possible care, and further the wire can be supposed practically of equal thickness throughout the coil).

q is the metallic section of the wire, and δ the non-metallic section due to the necessary insulating covering of the wire.

Further we have

$$g = U \frac{b}{q\lambda} \text{ where } b \text{ is the length of an average convolution and } \lambda \text{ the}$$

absolute conductivity of the wire material supposed to be a constant for the coil.

• Now, for brevity's sake, we will suppose that δ , the cross-section of the insulating covering, can be neglected against q the metallic cross-section of the wire.

Consequently we have

$$\frac{A}{cq} = U \text{ (approximately)}$$

and

$$g = U \frac{b}{q\lambda}$$

$$\therefore U = \sqrt{\frac{A\lambda}{bc}} \cdot \sqrt{g}$$

$$\text{or} \quad n = \sqrt{\frac{A\lambda}{bc}}$$

$$\text{similarly} \quad n' = \sqrt{\frac{A'\lambda'}{b'c'}}$$

$$\therefore \frac{n'}{n} = \sqrt{\frac{A'\lambda' bc}{A\lambda b'c'}}$$

But using wire of the same conductivity in both the differential coils, which should be as high as is possible to procure it, and further supposing the manner of coiling to be identical in both coils, we have

$$\lambda = \lambda'$$

$$\therefore \frac{n'}{n} = \sqrt{\frac{A' \cdot b}{A \cdot b'}}$$

Further we know that if the shape and dimensions of each coil are given, and in addition also their distance from the magnet acted upon, it will be always possible to calculate m and m' , though it may often present mathematical difficulties, especially if the forms of the two coils differ from each other and are also not circular. This latter condition is generally necessitated in order to obtain the greatest absolute magnetic action of each coil in as small a space as possible.

However it is clear that we may assume generally that the two coils have each an average convolution of identical shape and of the same length, placed at an equal distance from the magnet acted upon, and that therefore the magnetic action of each coil is dependent on the number of convolutions only.

In this case we have evidently

$$m = m'$$

$$b = b'$$

$$\frac{n'}{n} = \sqrt{\frac{A'}{A}}$$

$$\text{and as } p = \frac{n'}{n} \cdot \frac{m'}{m}$$

we have finally

$$\frac{A'}{A} = \frac{w'}{w} \dots\dots\dots e.$$

Equation *e* shows at once that under the supposed conditions, *i. e.*, when the average convolutions in each coil are of equal size and shape, the wire used in either coil is of the same absolute conductivity, and that the thickness of the insulating material can be neglected against the diameter of the wire :

The wire used for filling each coil must be invariably of the same diameter, otherwise a maximum sensitiveness is impossible.

How the above simple law expressed by equation *e* would be altered, when the given suppositions were not fulfilled, must be found by further calculation, but as the latter is intricate and a more general result is not required in practice, I shall dispense at present with this labour.

Special Differential Galvanometers.—Here shall be given the special expressions to which the general equations *a*, *b*, *c* and *d*, are reduced when certain conditions are presupposed.

1st case.—When *w* and *w'*, the two resistances at which balance is arrived at are so large that *f*, the resistance of the testing battery can be neglected against either of them without perceptible error. Substituting therefore *f* = 0 in equations *a*, and *b*, we get :

$$g = \frac{w}{3} \dots\dots\dots a.$$

$$g' = \frac{w'}{3} \dots\dots\dots b.$$

and the other two remain as they are namely :

$$p^2 = \frac{w'}{w} \dots\dots\dots c.$$

$$C = \frac{w'}{w} \dots\dots\dots d.$$

2nd case.—When the battery resistance *f* cannot be neglected against either *w* or *w'*, but when the two resistances at which balance is arrived at are invariably equal.

Thus substituting in the general equation

$$w = w' = w$$

we get

$$g = g' = g = -\frac{w+f}{3} + \frac{1}{3}\sqrt{4w^2 + 8fw + f^2} \dots\dots\dots a, b.$$

$$p^2 = 1 \dots\dots\dots c.$$

$$C = 1 \dots\dots\dots d.$$

3rd Case.—When the conditions given under 1 and 2 are both fulfilled
or $w = w' = w$
and $f = 0$
then we have

$$g = g' = g = \frac{w}{3} \dots\dots\dots a, b.$$

$$p^2 = 1 \dots\dots\dots c.$$

$$C = 1 \dots\dots\dots d.$$

The very same result which was obtained by direct reasoning at the beginning of this paper.

Applications.—Though the problem in its generality has now been entirely solved, it will not perhaps be considered irrelevant to add here some applications.

For our purpose differential galvanometers may be conveniently divided into two classes, *viz.*, those in which the resistances to be measured vary within narrow limits, and those where these limits are extremely wide.

To the first class belong the differential galvanometers which are used for indicating temperature by the variation of the resistance of a metallic wire, exposed to the temperature to be measured. As for instance, C. W. Siemen's Resistance Thermometer for measuring comparatively low temperatures, or his Electric Pyrometer for measuring the high temperature in furnaces.

It is clear that for such instruments the law of maximum sensitiveness should best be fulfilled for the average resistance to be measured, which average resistance under given circumstances is always known.

To the second class belong those differential galvanometers which are used for testing Telegraph lines, at present the most important application of these instruments. In this case each differential coil should consist of separate coils connected with a commutator in such a manner that it is convenient to alter the resistance of each coil according to circumstances, *i. e.*, connecting all the separate coils in each differential coil parallel, when the resistances to be measured are comparatively low, and all the separate coils consecutively, if the resistances to be measured are high. &c., &c., fulfilling in each case the law of maximum sensitiveness for certain resistances, which are to be determined under different circumstances differently, but always bearing in mind that it is more desirable to fulfil the law of maximum sensitiveness for high resistances, when the testing current in itself is obviously weak, than for the low resistances.

An example will shew this clearer. Say for instance a differential galvanometer has to be constructed for measuring resistances between 1 and 10,000. A Siemen's comparison box of the usual kind ($\frac{1}{10,000}$) being at disposal, it will be convenient and practical to decide that the two differential coils should be of equal magnetic momentum, from which it follows that C as well as p must be unity, or in other words that the two coils must be of equal size, shape and distance from the needle, and must also have equal resistances, *i. e.*, must be filled with copper wire of the same diameter. The resistance of each coil is then found by

$$r = \frac{w + f}{3} + \frac{1}{3} \sqrt{4w^2 + 8fw + f^2}$$

where f is the resistance of the battery and w a certain value between

1 and 10,000, the two limits of measurement. The question now remains to determine w .

It is clear that the law of maximum sensitiveness has not to be fulfilled for either limit, because they represent only one of the 10,000 different resistances which have to be measured, but it is also clear that to fulfil the law for the average of the two given limits would be equally wrong, inasmuch as the maximum sensitiveness is far more required towards the highest than the lowest limit. We may assume, therefore, that it is desirable to fulfil the law for the average of the average and the highest limit, which gives

$$w = 7500$$

against which the resistance of the battery may always be neglected.

Consequently we have

$$g = \frac{w}{3} = 2500$$

for each coil.

Now if the coil be small, and consequently the wire to be used for filling it is thin, the value $g = 2500$ wants a correction to make allowance for the thickness of the insulating material, by which g becomes somewhat smaller.*

Before concluding I may remark that the question of the best resistance of the coil, when the resistance to be measured varies between two fixed or variable limits, can be solved mathematically by the application of the Variation Calculus.

* These expressions for g and g' must be corrected, if the thickness of the insulating covering of the wire cannot be neglected against its diameter. The formula by which this correction can be made was given by me in the *Philosophical Magazine*, January, 1866, namely

$$\text{corrected } g = c g \left(1 - 4 \sqrt{g m^2} \right)$$

where g = the resistance to be corrected and expressed in Siemen's Units,

$$\text{and } m = \delta \sqrt{\frac{c \pi \lambda}{A B}}$$

δ = radial thickness of the insulating covering expressed in millimetres.

• c = a co-efficient expressing the arrangement adopted for filling the available space uniformly with wire. Namely, if we suppose that the cross section of the coil, by filling it up with wire, is divided into squares we have $c = 1$, if in hexagons $c = 3.4$. &c., &c.

λ = absolute conductivity of the wire material ($\Pi g = 1$ at freezing point).

A = half the section of the coil in question when cut normal to the direction of the convolutions, and always expressed in square millimetres.

B = length of an average convolution in the coil, and expressed in metres.



ON THE LAND-SHELLS OF PENANG ISLAND, WITH DESCRIPTIONS OF THE
ANIMALS AND ANATOMICAL NOTES; *part second*,* HELICACEA,—

by DR. F. STOLICZKA.

[Read and received 7th August, 1872.]

(With plates I to III.)

In this group of pulmoniferous land-shells I shall notice *twenty* three species, belonging to the *Zonitidæ*, *Helicidæ*, *Bulimidæ*, *Clausiliidæ*, *Philomycidæ*, *Pupidæ*, *Streptaxidæ*, *Veronicellidæ* and *Vaginulidæ*. The majority of the species are new, except a few previously described from the neighbouring country, and on one or two of such commonly distributed species, as are *Stenogyra gracilis* or *Ennea bicolor*.

Nearly all the species had been collected with the animals living, and I have spared no pains in order to make the detailed anatomical account as complete, as it appears desirable for a correct generic determination.

I scarcely need to mention, that on the whole the fauna is characteristically Malayan, the same fauna which extends from the Philippine islands through Burma and Arakan into the warm valleys of Sikkim. In the plains of Bengal it mixes with the Indian fauna proper.

I cannot help repeating the urgent request to my conchological friends in India, that they may favour me with live specimens of the species of shells occurring in their neighbourhood. In the *Helicacea* especially, the anatomical characters are indispensable for a correct generic determination, and without this it will not be possible to obtain a natural arrangement of our terrestrial Mollusca.

Fam. Zonitidæ.

RHYSOTA† CYMATIUM, (Benson). Pl. i, figs. 1-3 and pl. ii, figs. 13-15.

Helix Cymatium, Benson, apud Pfeiffer, Novit. Conch. I, p. 58, pl. xvii, figs. 1-2.

Penang specimens, which slightly differ in the height of the spire, (see figs. 1-3, pl. i.) agree in almost every point of structure with the type shell, described by Pfeiffer from Lancavi, a small island situated a few miles north of Penang. The increase of the volutions is in both exactly the same, the upper side of the whorls is marked with fine oblique rugosities, the lower is spirally striated; in fresh specimens the former is silky brown, the lower olivaceous brown, the inside of the aperture is in full grown specimens cover-

* Continued from J. A. S. B., for 1872. Vol. XLI, pt. ii, p. 271.

† Albers, *Heliceen*, edit. E. v. Martens, p. 54.

ed with a kind of a nacreous callose layer. The only noticeable difference consists in the narrowness of the umbilicus, its width being in all the Penang specimens, which I obtained, about one twelfth of the diameter of the shell, while in Benson's type it is only one seventh of the same diameter.

The species is found all over Penang hill from elevations of about 300 to 2500 feet, and both on the ground as well as on trees, but chiefly on the latter; it is, however, not common, and adult shells are indeed extreme rarities.

The closely allied *Rh. densa*, (Adams)* only differs by a slightly smaller number of whorls, the last being much wider. *Rh. Chevalieri*, (Soudévet), differs in the same character, though it has the umbilicus of exactly the same size as the Penang variety of *equatum*.

The animal is stout and rather short, its total length being less than twice the diameter of the shell; the posterior part of the body is the shorter one, and above rather sharply ridged; it ends with a large gland and a projecting horn above it. The whole body is uniform more or less dark brown, laterally strongly warty and obliquely grooved; the pedal row is very distinctly margined on both sides with an impressed line, and the margin of the foot below it is broad, smooth, marked with alternately brown and pale oblique stripes, so as to give the appearance of a variegated fringe. The eye peduncles and tentacles are of usual proportionate length, dark brown or even blackish, the latter with pale tips. On the whole, the general colour of the specimens varies a great deal; the young are mostly pale brown with an olivaceous tinge, while in old ones the neck, including the head and pedicles, become almost black.

The mantle is somewhat paler than the body, its edge moderately thickened. There are two small linguiform shell-lobes present, a right one, just below the inner or posterior angle of the aperture of the shell, thus playing on the inner lip, and producing its moderately distinct nacreous and callose structure. The other lobe lies below the outer periphery of the shell on the basal side; it projects from the outer end of a rather elongated very narrow fringe, which is separated from the edge of the mantle itself. The right neck-lobe is entire, thick, rounded, somewhat freely projecting at the lower or umbilical end. The left neck lobe is divided in two portions, the upper elongately rounded, the lower much narrower, with the upper end somewhat pointedly extended. The edge of the mantle which secretes the umbilical margin of the peristome is internally considerably thickened, (comp. pl. ii, fig. 13).

I have not been able to see satisfactorily the exact structure of the genital system, but, as far as it could be examined, it appears almost entirely to agree with that of *Rhysofa semiglobosa*, figured by Semper. There certainly are no appendages present—neither on the penis, nor on the seminal duct or uterus.

* E. v. Martens, Ost-Asiat. Expedit. p. 230, pl. 10, fig. 1.

The jaw is smooth, semilunar, with a round projection in the middle of the concave edge; it is about 2.5 m.m. broad.

The radula is comparatively of very great length. In a middle-sized specimen it measured 7 m.m. in length and 3 m.m. in breadth, although one of the ends was not quite perfect. I counted 106 transverse rows and about 141 teeth in each row. The centre tooth has a comparatively short point without any lateral denticles, and is somewhat smaller than the adjoining laterals. The first of these has a long, laterally bent, rather blunt projection; the following very gradually decrease in size and the middle cusp becomes gradually more pointed and curved, while the basal plate decreases. With about the fiftieth tooth the end begins to become bicuspid, and on about the hundredth tooth on either side, the two cusps are sharpest and best developed.

Semper (Reisen im Archipel der Philipp., Vol. III, p. 68) says that *Rhysota* does not possess any developed shell lobes of the mantle. In the present species their existence is undeniable, and still all the other characters of the animal and shell point towards the greatest relation of *R. cymatium* to other typical species of the genus, which scarcely would have any meaning, if it were restricted in the sense given to it by Semper. I very much doubt, that all the species with polished lower surface of the shell, referred by Semper to *Rhysota*, have no shell-lobes. How then do they produce the smoothness of the shell? I generally found shell-lobes essential for that purpose. But supposing some of the species really had no shell-lobes, this would be no sufficient reason for excluding any other species which possess them from *Rhysota*; for in *Xesta* we have a similar mixture of forms with and without shell-lobes.

Thus the only anatomical difference, which remains to be considered as distinguishing *Rhysota* from *Xesta*, is the simple form of the genital organs in the former. How far this character is really reliable for generic distinctions, is a point by no means easily settled, as I had already occasion to notice when speaking of the anatomy of the two species of *Sitala* (*Conulema*, olim) (Journ. A. S. B., Vol. xl, Pt. ii, 1871, p. 236 &c.), *S. atlegia* and *S. infula*.

When we compare the characters relating to the presence or absence or form of the mantle lobes, we meet with a perfect similarity between *Rhysota* and *Rotula*. The distinction between the two merely rests in the presence of an amatorial gland in the latter genus, while the shells only differ in the upper side of *Rhysota* being irregularly corrugated, and in *Rotula* reticulately striated, or transversely costulated.

In speaking of the shell of *Rhysota*, Albers gives the peculiarly rugose upper surface as one of the most important characters of the genus.

*ROTULA** *BLUGA*, n. sp., Pl. i, figs. 4-7 and pl. ii, figs. 16-18.

R. depressa conoidea et suborbiculata, vel late conica, angustissime umbilicata, tenui, cornea, pallide succinea; anfractibus 5·5 ad 6·5, suturâ simplici, suprâ rare filiforme marginata, junctis, lente accrescentibus, in superficie superiore convexiusculis, costulis transversis obliquis, confertis, striis spiralibus confertissimis ac plus minusve distinctis intersectis, crispatulis seu subgranulosis, ornatis; ultimo ad peripheriam acute carinato, ad basin modice inflato, nitido, sublævigato, striis incrementi radiantibus atque alteris spiralibus sub-obsolete notato, medio concaviusculo; apertura angulatim semilunari, paulum obliqua, labio tenuissimo vix distinguendo, labro ad marginem tenui, neque expanso, neque incrassato, ad insertionem umbilicalem brevissime reflexo instructa.

Dimensiones varietatum frequentium:—

Diam. major.	D. minor.	Alt. testæ.	Alt. aperturæ.	Lat. aperturæ.
a. 11·5	13·5	11 0	6·0	7·6 m.m.
b. 16·2	15·0	10·9	6·6	8·2 „
c. 17·4	15·6	12·0	7·2	9·2 „
d. 17·4	16·0	10·9	7·0	9·0 „

Diam. maj. speciminis maximi 18.8 m.m.

It will be seen from the above measurements, which are taken from the four figured specimens, that the height of the shell is very variable, but the increase of the whorls is very nearly quite constant. The upper convexity of the whorls also slightly varies; the sides of the spire are generally nearly straight, more rarely conspicuously convex; occasionally the peripheral keel is somewhat projecting above the suture. The ornamentation is characteristically that of *Rotula*, reticulately sculptured above, nearly smooth below. The transverse ribs on the upper surface are traversed by fine spiral lines, which generally only produce a slight undulation in the direction of the ribs, sometimes, however, a fine granulation is formed. As regards form, the present species very closely resembles the Burmese *R. anceps*, (Gould), and also the South Indian *R. Shiplayi*, the first has, however, the upper costulation very fine and no spiral stria, while the latter has both much stronger developed, producing a granular surface, and the shell is also more solid. The third very closely allied species is *R. indica*, differing principally by a greater width of the last whorl, and also by a stronger sculpture.

* Comp. Journ. A. S. B., 1871, Vol. xi, pt. ii, p. 231. The name *Rotula* has also been applied in the ACTINOZOA, but if our zoological classification should make such rapid progress, as it has done lately, it will, I think, in no long time be almost impossible to find new names for the generic groups, and we shall be forced to modify the existing rules at least so far that the same name may become reapplicable in at least the five or six principal divisions of the animal kingdom. A further relaxation of the rule would scarcely prove beneficial and would hardly be necessary.

The animal of the Penang species, when fully extended, equals in length about twice the longer diameter of the shell; back roundly flattened above, foot posteriorly obtusely ridged, terminating with a large gland which is superseded by a small horn; pedal row very distinct and the edge of foot below obliquely striated. The general colour of the body is pale or livid grey, with a general reddish tinge when full grown. A pale yellow (in young), or more or less distinctly cinobor red (in adults), stripe extends along the centre of the back and the superior ridge of the foot, the former is bounded on each side by a broad black stripe, originating at the base of each peduncle and continuing to the mantle, and below this stripe there is again a yellowish or red line. The posterior red band is only edged with black. The sides of the foot, both anteriorly and posteriorly, are more or less distinctly variegated with impure black and tinged with red; front of head between the two pedicles and tentacles with a black spot; pedicles and tentacles generally greyish, the latter with a reddish tinge, and with pale, rather large, globular tips, the former with a black ring at the base where the longitudinal black bands begin.

The mantle is moderately thickened. The right shell lobe is entirely obsolete, or only indicated by a very slight extension of the edge, a short distance below the upper angle of the aperture of the shell. Sole of foot divided by a longitudinal groove. The right neck lobe is large and extends as a moderately broad fringe to near the retractor muscle where it terminates with a free end. The left neck lobe is smaller with a linguiform free outer end. The left outer edge of the mantle is externally also entire, like the right one, but about the middle of the basal portion it has internally a distinct lobe, about 2 m.m. in length, which in its situation strictly speaking lies between the shell and the neck lobe; but as it becomes reflected with its edge over the shell, it has to be regarded as the representant of the left shell lobe. The lower portion of the left neck lobe is only a thickened swelling, extending as a narrow inner rim of the edge of the mantle to near the umbilicus. Both the right and left neck lobe have a large black spot, in continuation of the lateral black bands of the back.

The general anatomy does not differ in any essential point from that of *B. anceps*, as briefly noticed by me in Journ. A. S. B., Vol. xl, pt. II, 1871, p. 233, pl. xvii, fig. 1.

The jaw is semilunar, perfectly smooth, with obtusely rounded corners, and a slight rounded projection in the centre of the concave edge; it is about 1.5 m.m. broad.

The length of the radula is about 4.5, and its breadth above 1.5 m.m.; it is composed of about 105 transverse, nearly straight rows of teeth, there being about 121 teeth in each row. The form of the teeth again very closely resembles that of *Rot. anceps*, (loc. cit.). All the points extend beyond the upper edge of the basal plate; the central is somewhat widened below

the terminal point, contracted in the middle, but it has no distinct denticles at the sides. The laterals gradually become more and more turned, and curved, with a small inner and scarcely a trace of an outer denticle; up to the 20th they very gradually diminish in size, then a very slight break follows, the 21st being somewhat sensibly smaller and first distinctly bicuspid at the tip, while at the same time the size of the basal plate has much diminished, until in the last teeth it almost entirely becomes obsolete; the two terminal cusps on the other hand become gradually more and more equal.

The genital organs have a distinct amatorial gland, possessing near its origin a large globose appendage, internally composed of an elliptical largely cellular mass, in which the cells are concentrically arranged with their longer diameter perpendicular to the walls of the ellipse. The posterior part of the gland is filled with a finely granular substance,—probably calcareous particles. The vas deferens has only one slight enlargement about the middle of its length; it consisted in a simple thickening of the walls, but I could not trace any calcareous particles in it. Towards the end, where the penis is lodged, the tube is widest and somewhat curved, but there are no other appendages, or calcareous sacs accompanied with a flagellum, present, such as have been observed in many other species of *Rotula*.

*SITALA** *CARINIFERA*, n. sp. Pl. i, fig. 8.

Testa globose conoidea, cornea, apice obtusula, angustissime perforata; anfractibus quinque, gradatim accrescentibus, convexe angulatis, sutura simplici junctis, transversim minutissime striolatis, superis infra medium carinis filiformibus duobus ornatis, ultimo ad peripheriam tricarinato, basi planate convexiusculo, lævigato; apertura semilunari, verticali, non descendente, labro extus tenuissimo, in regione columellari paululum reflexiusculo.

Diam. maj. 2·2, minor 2; alt. testæ 2 m. m.

Hab.—‘Penang hill,’ in foliis *Coffeæ arabicæ*, specimen unicum.

The animal of this species is exactly like that of *S. infula*, figured in pl. xviii, in J. A. S. B., Vol. xl, Pl. ii, for 1871; it has a generally pale brownish grey colour; but having obtained a single specimen, I did not like to sacrifice the shell, in order to notice the internal structure; for when examining these little species one is by no means sure, that he will obtain from a single specimen an insight into the whole anatomy.

The present species is closely allied to the Nilgheri *Helix tricarinata*. Blf., which is also a *Sitala*, and differs by a more depressed and broadly conical shape, and by having a much wider umbilicus.

* H. Adams proposed this name for *Helix infula*, Bens., as type (P. Z. S. for 1865, p 408). I had unfortunately overlooked this reference, when I proposed for Benson's *atogina* (and *infula* and a few others) the name *Conulema*, which must now be regarded as identical with *sitala* (J. A. S. B., xl, pt. II, p. 236.)

*MACROCHLAMYS** *STEPHOIDES*, n. sp. Pl. i, fig. 9, and pl. ii, figs. 19-20.

M. orbiculata, spira depresso convexiuscula, basi medio concaviuscula, angustissime perforata, tenui, succineo cornea, unicolore, circa umbilicum albescente; anfractibus sex, lentissime accrescentibus, sutura lineari junctis, infra suturam angustissime adpressis, nitidis, fere politis, striis incrementi transversis minutissimis, nonnunquam fere omnino obsoletis, notatis, supra convexiusculis; ultimo ad peripheriam fere uniforme convexo; apertura sub-semilunari, vix obliqua, labio per-tenui, labro simplici, ad basin paulum sinuose producto, ad insertionem umbilicalem anguste atque breviter reflexo. Diam. maj. 11·6, d. min. 10·7, alt. 7; alt. apert. cum perist. 4·8, ejusdem lat. 5·6 m.m.

The nearest ally of this species, as regards general character and size, is the Andamanese *Macroch. stephus*,† (Benson), differing from the present species by a somewhat more depressed form and by having the sides of the spire nearly straight or slightly concave, but not convex. *Macroch. hyalina*,‡ Martens, is also very closely allied, it is a larger shell and with a more rapid increase of the volutions, the difference between the smaller and larger diameters being 2·5 m.m. In Burma and Sikkim several other allied forms occur, such as *M. hypoleuca*, *patane*, *petasus*, &c., but they are all smaller and more depressed shells.

The species is rare; I found a single live specimen and half a dozen of old shells at the base of Penang hill, about 300 feet.

The animal is long and very slender, blackish grey above and on the pedicles, paler at the sides of the foot, which has a long and thin horn above the tail gland. Both shell and neck lobes are well developed, the right ones larger than the respective left ones. The two shell lobes are linguiform, and the right one, when fully expanded, covers almost half of the upper surface of the shell. The lower portion of the left neck-lobe is merely represented by a slightly thickened rim, extending from the place of insertion of the left shell-lobe to near the umbilicus.

The jaw is one mill. broad, with a central rounded tooth in the concave edge and with the corners somewhat bent outwardly; a form which is also met with in several other species of *Macrochlamys*.

The radula has not been seen perfect, but it does not appear to have been more than four mill. long, and there appear to have been at least 101 teeth in each transverse row; all with very sharp points; the central with

* Comp. Journ. A. S. B., vol. xl, pt. ii, 1871, p. 246.

† The figure of this species in Conch. Ind., pl. 62, is taken from a young or imperfect specimen, in which the peculiarly depressed form is not so well discernable as in an adult shell. Fig. 6 on the same plate is incorrect, because it does not shew the sinuately produced median basal portion of the peristome.

‡ Preuss. Exped. nach Ost Asien, II, p. 241, pl. 12, fig. 5.

a distinct denticle on either side, and the last laterals with two small unequal cusps; all have the basal plate obtusely narrowed outwardly.

The genital organs are very similar to those of *M. indicus*, Benson, but much more slender; the amatorial gland is very thin (in a young specimen), there is a small cœcal appendage on the vas deferens, and a flagellum at the base of the penis, just before a swelling filled with calcareous particles.

*MICROCYSTIS** *PALMICOLA*, n. sp. Pl. i. fig. 10.

M. testa late conica, tenui, cornea, angustissime umbilicata; anfractibus quinque, gradatim accrescentibus, convexiusculis, sutura simplici junctis, supra splendore albide sericino, transversim oblique, minutissime atque confertissime, striolatis, ultimo ad peripheriam acute angulato; basi convexiuscula, olivaceo nitita; apertura subsemilunari, extus angulata, obliqua; labro tenui, simplici, ad basin recedente, ad umbilicum reflexo; labio tenuissimo, vix distinguendo. Speciminis maximi diam. maj. 2·8, d. minor 2·6, alt. 2·2, diam. apert. 1·7, ejusd. alt. 0·95 m.m.

Hab.—Penang, sub corticem *Coccoz nuciferae*, haud frequens.

The shell is distinguished from allied species by its comparatively sharply angular last whorl, slightly inflated base and by the peculiar silky and very finely striated upper surface.

The animal when fully extended equals in length about four diameters of the shell; it is rather dark brownish grey, darkest on the tentacles and on the rostrum; posterior gland superseded by a small horn.

HELICARION† *PERMOLLE*, n. sp. Pl. i, fig. 11 and pl. ii, figs. 21-23.

H. testa depresso inflatæque conoidæ, tenuissima, fere membranacea, translucens, pallide lutescens, vix perforata, spira ultimo anfractu multo brevior; anfractibus 4·5, rapide accrescentibus, ad suturam simplicem adpressis, nitidis, convexiusculis, ultimo inflato, ad peripheriam rotundato, transversim lente arcuateque striatulo, ad basin striis spiralibus sub-obsoletis notato; apertura lunari, valde obliqua, labio albescente, minutissime punctulato, labro tenuissimo, simplici, ad basin valde recedente, ad marginem interiorem umbilici breviter reflexiusculo. Diam. maj. 8·4, d. min. 7·4, alt. 6·3; alt. apert. cum perist. 4, ejusd. lat. 4·3 m.m.

The rather strongly elevated spire, and the membranaceous and transparent structure of the shell, separate this species from the numerous allied forms of the Philippines. The species is rare; I only obtained about half a dozen specimens on low bushes or between old vegetable matter on the ground, about 500 feet above the sea, on Penang hill.

* *Microcystis*, Beck. Comp. Semper in Reis. Arch. Philipp., pt. II, vol. iii, 1870, p. 43, and Stoliczka in J. A. S. B., vol. xl, pt. II, p. 251.

† Semper, Reisen Archip. der Philippinen, vol. iii, p. 20.

The animal is slender and very long; when fresh the extended foot is three times the longer diameter of the shell, which is then entirely covered by the mantle; but in captivity the shell lobes shrink very rapidly, being reduced to narrow linguiform appendages. Middle of back and of the hind foot whitish or very pale brownish, with a slight pinkish tinge; a broad blackish band runs from each pedicle along the sides of the whole back, and also on the sides of the posterior part of the foot, as far as the terminal gland, which is superseded by a very distinct pointed horn; the dark colour extends down to the pedal row, while a large black spot about the middle of the foot on each side reaches down to the sole; pedicles long, grey; tentacles short and almost white; mantle blackish with small whitish dots. All the four mantle lobes are well developed, the left shell and neck lobes are proportionately somewhat larger than the corresponding right ones, and each of the former has a deep but narrow incision in its lower portion.

The jaw is about one mill. broad, quadrant shaped, smooth, without any projection in the centre of the concave edge, like in most other species of the genus.

The radula is moderately broad and nearly 2.5 m.m. long; there are 95 transverse rows and about 121 teeth in each row, all remarkably small and from the tenth tooth they somewhat rapidly decrease in size towards the edges. The centre tooth has two distinct denticles on either side and a third much smaller one nearer to the base; the principal cusp is pointed. On the subsequent teeth the inner denticles disappear first, and gradually altogether, then the lower outer, while the upper outer remains, until at last it equals the principal cusp, so that the outermost teeth become almost regularly, though shortly, bicuspid.

The general anatomy does not offer any peculiarity requiring special notice. The nervous and digestive apparatus agrees with that of other ZONTIDÆ, except perhaps that the liver is enormously largely developed. The female portion of the genital system has a long sub-podunculate receptaculum seminis, branching off at its origin. The vas deferens is very short, passing into a rather widened tube, again somewhat contracted near the base of the penis, which is attached by a special strong muscle. The end of the penis widens very rapidly for a short distance before it joins the hermaphrodite opening. I have not observed, in two specimens examined, any cœcal or calciferous appendages.

Genus. *TROCHOMORPHA*, *Albers*.

HELICEN, Edit. E. v. Martens, p. 60, and Proussiche Exped nach Ost Asien vol. ii, Landschnecken, 1867, p. 245; *Nigritella* and *Videna*, ibidem. *Sivella*, Blauf.

The type of this genus is *Helix trochiformis*, Fér., which is characterised by a moderately solid, sub-discoid or depressedly conical shell, the whorls being flattened above, the last carinate at the periphery, the aperture rhombiform or narrowly semilunar with simple sharp edges, but the columellar lips occasionally internally somewhat thickened and slightly reflexed.

I do not know whether the animal of this typical species had been examined, but I have observed those of about a dozen different species, which evidently belong to the same type, and I find that all of them possess a very fine glandular slit at the upper end of the foot, the pedal row being in all also, distinct; they have, therefore, to be referred to the ZONITIDÆ, as already noticed in my paper on the Moulmain shells in Jour. A. S. B., vol. xl, pt. II, 1871, p. 225.

Judging from a somewhat more intimate examination of the animals of a few species, the following characters have to be added to those derived from the peculiar shape of the shell.

Animal moderately slender, with the posterior part of the foot shorter than the anterior, the former terminating above with a small glandular slit; pedal row distinct; mantle with elongated narrow neck lobes, but with the shell lobes entirely wanting, left neck lobe sometimes divided or insinuated in the middle; jaw smooth; genital organs without amatorial gland, or any other appendages; seminal receptacle and seminal duct very long.

The *Trochomorphæ* live on the ground generally in decaying vegetable matter, under or on old wood. Three species have been found on Penang.

Albers, while noticing several typical species, such as *T. planorbis*, Less., under his genus *Discus*, referred to *Trochomorpha* a most varied mixture of shells: for instance; *anceps*, Gould, *serrula*, Bens. etc. which belong to *Rotula*; *Barrackpoorensis*, Pfr., is a *Kaliella*; *cacuminifera* and *infula*, Bens. are *Sitalæ* (= *Conulema*, olim); *H. capitium*, Bens., does not belong to the present family, but to the next, the true *Helicidæ*, etc.

E. v. Martens (l. cit. pp. 246 and 247) adopted two groups in the genus *Trochomorpha*; the one, for which he proposes the name *Nigritella*, includes the obtusely conoid and more solid shells, sometimes with a somewhat obtuse periphery; these are true *Trochomorphæ*, of the type of *H. trochiformis*, or of *Troch. Ternatana*, Guillou; the name *Nigritella* is, therefore, entirely superfluous. The second group is classed by Martens as *Videna*, Adams; it includes the more planorboid and sharply keeled species of the type of *H. planorbis*, Less. For this same group, (type *H. castra*, Benson,) W. T. Blanford proposed the subgeneric name *Sivella*.

Judging from the similarity of the shells of these two groups and from what we know of the animal of *T. Ternatana*, observed by Martens, I very much doubt that any necessity exists for subdividing the genus *Trochomorpha*.

TROCHOMORPHA CASTRA, (*Benson*). Pl. i, figs. 14-16 and pl. ii, figs. 7-9.

Helix castra, Benson, Ann. and Mag. Nat. Hist., 1852, vol. x, p. 349.—Reeve, Conch. Icon., *Helix*, No. 1160.

The shell is subject to a very considerable amount of variation as regards the elevation of the spire. Young specimens are sometimes almost planorbular, and in some adults the total height of the shell is scarcely more than one-third of the larger diameter, while in others it somewhat exceeds one half of the same dimension. The width of the umbilicus varies from 0.2 to 0.3 of the diameter of the shell. The base is always distinctly spirally striated, but on the upper side the oblique transverse striae of growth prevail. The usual colour is pale horny, sometimes brown with a pale band below the suture.

The species is very rare on Penang hill, but it is common in Pegu, Arakan, Assam, Sikkim, and within the last few years it became abundant in the botanic garden near Calcutta, having been most likely introduced from Darjeeling. One of the largest Sikkim specimens in my collection measures: larger diam. 13, smaller diam. 12, height of shell 7, same of apert. 3, width of same 5.4 m.m.

The animal changes from dark leaden to blackish grey, being always paler at the sides of the foot, generally tinged with brownish below the pedal row; tentacles and pedicels mostly somewhat darker than the body; neck distinctly warty; sole dark grey, entire, without any distinct furrows; tail gland represented by a fine slit about one mill. long. The total length of the foot generally equals one and a half diameters of the shell, the caudal portion being always shorter than the anterior one. The mantle is blackish and in its extent above the large pulmonary cavity variegated with pale spots.

The jaw is smooth, very thin, almost semicircular, with broad oblique ends and a small, in younger specimens sometimes almost obsolete, projection in the centre of the concave edge; its width is about one half millimetre.

The radula is narrow, about two mill. long, or slightly longer, composed of about 85 transverse straight rows, there being about 101 teeth in each of them. All have very sharp, long and pointed cusps, the central with a small denticle on either side near the tip; on the outer ones, as they turn laterally and gradually decrease in size, the inner denticle disappears, while the outer increases, until on the last 15 or 20 teeth, preceding the 3 or 4 terminal ones, it equals the principal cusp. The last few teeth are short, broad, and their outer cusp becomes almost entirely obsolete, the teeth presenting merely an oblique sharp edge.

The female portion of the genital organs has a globular swelling near its origin at the hermaphrodite opening, and the receptaculum seminis

branches off above this gland, it is fully one inch long, somewhat thickened in the middle. The penis is attached by a short muscle, about 4 m.m. long and moderately thickened.

TROCHOMORPHA CANTORIANA, (*Benson*). Pl. i, fig. 13.

Helix Cantoriana, Benson, Ann. and Mag. Nat. Hist., 1861, vii, p. 85.

Five specimens which I found on Penang hill (at about 2000 feet elevation) exactly correspond with Benson's description, which was taken from a solitary specimen obtained by Dr. Cantor on the small island Sung-Sung near Penang. The illustration given on plate i will dispense with a repetition of the description quoted above. The apex is smooth, slightly swollen, and there are scarcely more than five whorls in specimens of 10 m.m.

The animal is blackish grey with a very narrow, pale dorsal stripe, quite similar to that of *T. castra*, but by some accident no specimen was preserved in spirit, so I cannot give any further details of its structure; it is, however, certainly a *Trochomorpha*. The specimens were found under a log of old wood.

TROCHOMORPHA TIMORENSIS, Martens. Pl. i, fig. 17, and pl. ii, figs. 10-12.

E. v. Martens, in Preuss. Ost-Asiat. Exped., 1867, II, p. 248.

Penang specimens, of which I obtained sixteen, entirely agree in form and structure with the shell described by E. von Martens, with the single exception that the last whorl is not descending near the aperture, but there is an inclination to it, as its terminal portion in adult specimens is slightly more bent downwards than the preceding part (comp. figs. 17*a* and 17*b*). This character is, however, certainly a variable one; it does also occasionally occur in adult specimens of *T. castra* and *T. planorbis*. The differences noticed by E. v. Martens regarding the greater number of whorls, and the larger umbilicus, with less rapidly descending sides, in *Timorensis*, when compared with *planorbis*, are well marked in Penang examples.

The species is found sparingly on or under old wood all over Penang hill; *T. planorbis* was not met with there, but it is a very abundant shell at the Nicobars.

The animal is uniform blackish, mantle more intense black; pedal row distinct and the edge of the foot below it nearly quite smooth; neck and sides covered with small warts; tail gland represented by a very fine slit, scarcely more than half a millimetre long.

The jaw and radula are quite similar to those of *T. castra*. The former is about three quarters mill. broad, with somewhat curved-out ends and a broadly rounded central projection in the concave edge. The teeth are very slender, and the lateral denticles are very close to the tip on the centre tooth. The outer denticle descends a little lower down on the laterals, but it

always appears to remain smaller than on the corresponding teeth of *T. castra*; the outermost laterals were not observed, they must be very thin.

The genital organs are distinguished by a very great length of the seminal receptacle and of the seminal duct; the former is one and a half to nearly two inches long; it is somewhat widened near its origin but further on almost throughout equally thin.

Fam. Vitrinidae.

VITRINA NUCLEATA, n. sp. Pl. i, fig. 12 and pl. ii, figs. 4-6.

Vit. testa depresso ovata, tumidula, tenui, pallide cornea, translucens; anfractibus 3·75, nucleo 1·5 anf. composito, late conico, inflato, lævigato, duobus anf. sequentibus ad suturam adpressis, subcanaliculatis, rapide accrescentibus, nitidis, transversim-striis incrementi minutissimis notatis; apertura ampla, per-obliqua, labio undique tenuissimo, ad basin valde recedente, margine supero convexiusculo. Diam. maj. ♀, diam. minor 7, alt. test. 5·3, alt. aperturæ 4·8, ejusdem latitudo 6·1 m.m.

A characteristically distinct species, by having the nucleus composed of one and a half whorls, conically tumid, while the next whorl is at its beginning only very narrowly exposed, or almost entirely covered. The outer lip is very thin, almost membranaceous, and simple throughout.

V. nucleata is one of the rarest Penang shells. I found three live specimens on the Penang hill in dense forest on old wood, about 1000 feet above the sea, and two more old shells at the base of the hill.

The animal is entirely black, only slightly paler at the front sides of the foot; it is very long and slender, its total length being about four times that of the longer diameter of the shell; the anterior part is the much shorter one, the posterior tapers into a point, and the whole is warty and grooved. The mantle, however, is nearly smooth. In quite fresh specimens the two shell lobes entirely cover the shell, but generally the left lobe covers a little more than one fourth of the last whorl extending from the margin of the mouth, while the right lobe also covers one-fourth of it beginning at the angle of the mouth, but at the same time also envelopes the whole spire. The neck lobes are also well developed, rounded, with simple edges, the left is much larger and longer than the right one. The sole of foot is pale brown, divided by two grooves in nearly three equal parts, of which the median is smooth and the lateral transversely sulcated. Pedal row well marked by a thin groove above and along the entire base of foot.

The jaw is semilunar, radiately finely striated, with a blunt projection in the centre of the concave edge; the outer or convex portion is smooth; it measures about 0·75 m.m. in breadth.

The radula is about two mill. long and half a mill. broad; there are 110 transverse, almost quite straight rows, but only 61 teeth in each of them.

All have very sharply pointed cusps, the central has two small lateral denticles on either side; on the outer ones these denticles almost entirely disappear.

The genital organs are distinguished by a great length of the uterus, at the end of which lies a large albuminous (*ag.*) and hermaphrodite gland (*hg.*). The seminal receptacle (*rs.*) is a long, pedunculated, spacious bag which includes a peculiarly twisted, horny organ, provided on the concave side with short crispate appendage. It is the same problematic organ which I described in *Sesara infrendens*, Gld., and *Macrochlamys* [*Durgella*] *honesta*, Gld., (Comp. J. A. S. B. XL., Pt. II, p. 242 and 250, pl. xvi, fig. 5 and 6, and pl. xvii, fig. 13). Whether this structure represents the amatorial organ and whether that which we call a seminal receptacle really possesses the function which we attribute to it, appears to be as yet an open question. In the present species I found the terminal end of the so-called seminal receptacle filled with a milky substance, which under a high power exhibited a quite irregular flaky appearance.

In other respects the present species does not offer any anatomical peculiarities. The œsophagus is comparatively thin, long, cylindrical. The kidney, situated near the end of the rectum, is very large, of a broadly triangular shape; the liver enormously developed.

Some years passed the *Vitrinæ* had been classed as a subfamily of the *Helicidæ*; more recently they had been by various authors treated with the *Zonitidæ*, in the Oxygnathe group of HELICACEA. I think the older classification is preferable, as entered by Binney and Bland in their Land and Fresh-water shells of N. America. But I would prefer to give them, together with *Helicolimax*, *Hyalina* and their allies, a position intermediate between the two families. They combine indeed several of the characters of both. Although they do not possess a terminal mucous gland on the end of the foot (as all *Zonitidæ* do), they have a more or less distinct pedal row, and the sole appears to be often divided by longitudinal grooves. The jaw is entirely or partially finely transversely striated, not quite smooth, as usually in *Zonitidæ*, and not ribbed, as in true *Helicidæ*. However, the teeth, particularly the outermost laterals, have more the pointed character of the former than of the next family.

Fam. Helicidæ.

TRACHIA* PENANGENSIS, n. sp. Pl. iii, figs. 1 and 18-20.

T. suborbiculata, alta, spira breviter elevata, obtusa, modice sed profunde umbilicata, tenui, fere cornea, cuticula luteo-fusca densæ et breviter pilosa induta, unicolore; anfractibus 4-5, convexis, sutura profunde subcanaliculata junctis, ultimo ad peripheriam uniforme convexo, ad aperturam paulo descen-

* Compare, Stoliczka in Journ. A. S. B., vol. xi, Pt. II, 1871, p. 223.

dente, ad marginem umbilici obtuse angulato; apertura semilunari, labio tenui, labro expanso atque reflexo, ad insertionem umbilicalem paululum dilatato, ad basin indistincte subangulato, pallide violaceo tincto. Diam. maj. 16, diam. min. 14·5, lat. aperturæ cum perist. 8·8, ejusd. alt. 8·2 m. m.

As regards the thin, almost horny, fulvous, thickly and finely setose structure of the shell, this species is probably most closely allied to *T. erinacea*, Pfr., but it differs from it, as well as from two other very similar forms, *T. quieta*, Reeve, and *T. eustoma*, Pfr., by its conspicuously more elevated spire. Other species of similar type, like *T. breviseta*, Pfr., from Siam, *T. Helferi*, Bens., from the Andamans, and four or five others described by Pfeiffer and E. v. Martens have nearly all a more depressed form and mostly sub-angular last whorl, although their spire is somewhat elevated.

The animal is dark chocolate brown, with a very narrow pale dorsal and caudal stripe, the body is laterally somewhat more blackish in front, and tinged brownish behind; the posterior end of the foot is the shorter one, as in *Trochomorpha*, although not to the same extent.

The jaw is quadrant shaped, with about six strong ribs,* and one or two less distinct ones on either side; it is 1·3 m.m. broad.

The radula is about 2·5 m.m. long., and 1. m.m. broad; there are 95 transverse rows, and 91 teeth in each of them, decreasing in size the more they approach the edges. The centre tooth is slightly smaller than the first laterals. All have a large basal plate, which is on the centre tooth slightly emarginate in the middle of the upper edge; this emargination increases in depth on the laterals, the inner branch remaining smaller, until on the last ones the upper edge becomes represented by two obtuse branches. The hook is on all teeth comparatively small, broad, with a moderately sharp point. On about the tenth tooth a small denticle appears to shew on the outer edge near the tip, becoming more distinct on the following teeth. After the eighteenth lateral, the teeth become somewhat more rapidly shorter, but increase in width until the last are wider than long, or high, and on these the basal plate has almost entirely become obsolete.

The genital organs are more than an inch long. The female portion has a long seminal receptacle, strongly thickened and muscular for some distance from its origin, then passing into a long thin tube and terminating with a moderately enlarged bubble, attached by very thin muscular fibres to the albuminous gland which is situated at the end of the uterus. The vas deferens takes its origin near the upper end of the uterus; it is attached by numerous thin threads at the hermaphrodite opening, and after a short distance enlarges into a muscular tube. At the beginning of this enlargement is a short pointed flagellum (*f*), and at the

* Evidently very much like that of *Campylæa*.

other end, where the penis begins, is a retractor muscle. The penis itself has near its base a coecal appendage; its terminal portion, before it joins the hermaphrodite opening, is very thin.

A comparison of the genital organs with those of *Trachia delibrata*, represented in J. A. S. B., vol. XL, Pt. II, 1871, pl. xvi, fig. 1, will shew, that the only essential difference consists in the presence of the small coecal appendage on the penis in *T. Penangensis*. The jaw has fewer and less strong ribs, than that of the former species, but the teeth themselves are extremely similar.

Taking all these anatomical characters together with those of the shell, as noticed in my paper cited above, I think we can consider *Trachia* as a fairly established genus of the HELICIDÆ.

HELIX [FRUTICICOLA] SIMILARIS, Fér. Pl. ii, figs. 1-3.

Comp. E. v. Martens in Preuss. Exped. nach Ost-Asien, vol. II, pp. 43 and 270, etc. Stoliczka in J. A. S. B. vol. XL, Pt. II, 1871, p. 224.

On Penang this species is mostly found in the coco-palm plantations up to a height of about 200 feet, never in the interior of large forests and at great elevations. The shells are of the usual small size (larger diam. between 12 and 13 m.m.), with or without a brown peripheral band. The striae of growth are generally fine, but in some specimens they accumulate to strong ribs which give the shell a very peculiar costate appearance.

I also obtained the species from Malacca, near Singapore, Hongkong, Chusan, Maccao, Canton, &c., northwards it extends through Tenasserim into Burma, where it is associated with a great number of closely allied species, some of which may prove to be mere varieties of it. I may mention *H. boiuss*, *H. scalpturrita*, *H. Zoroaster*, &c.

In Bengal itself the species is not known, but in Central India it is represented by *H. propinqua*, and on the Andamans by *H. hemiopta*. Judging from the great number of closely allied species in the Indo-Malayan region, there is certainly the greatest probability that the original habitat of *H. similis* falls within the Indo-Malayan Archipelago, and that it has been introduced into Mauritius, China and South America.

The animal is rather slender, all over strongly warty, brownish fleshy white, or pale brown, the pedal row is very slightly indicated by a fine groove; the pedicles and tentacles are greyish white, mantle dull milky white with a slight vermilion tinge. When the animal is quite fresh the total length of the foot is equal to from two and a half to three longer diameters of the shell.

The jaw is semilunar, about 1 m.m. broad, with three strong central ribs, followed by a somewhat broader one on either side, while the next is only indicated by a faint dark line.

The radula is when compared with the size of the animal, large, about 2·3 m.m. long, and somewhat more than one m.m. broad; it is composed of about 90 transverse rows, with 67 teeth in each of them. The central is much smaller than the adjoining laterals, with a long arched cusp. The laterals somewhat rapidly decrease in size after the 14th; on the outermost the basal plate gradually disappears, while the breadth of the teeth exceeds their length.

The genital organs are more complicated than in *Trachia*. The female portion has at its origin a rather short, thick muscular cœcal appendage, which most probably represents the amatorial gland; it is widened near its origin and at its rounded end. The seminal receptacle is a round bag, attached to a long thin peduncle of about the same length as the uterus. The seminal duct is moderately long, but the penis comparatively thick and attached by a strong muscle.

Fam. Bulimidæ.

BULIMUS.—Subg. *Amphidromus*.

The only two species which I found among the coco-palms were *Bulimus atricallosus*, Gould, and *B. interruptus*, var. *citrinus*; the uniform coloured greenish yellow variety. The former is the more common species.

Besides these two, the ubiquitous *Stenogyra gracilis* is by no means rare at the roots of palm trees.

Fam. Clausiliidæ.

CLAUSILIA (PHÆDUSA) PENANGENSIS, n. sp. Pl. ii, figs. 4-6 and 15-17.

C. testa fusiformi, plus minusve attenuata, medio ad anfractum penultimum latissima, non rimata, solidula, castanea, apice submammillata, albescente, anfractibus 9·5 ad 10·5, convexis, sutura simpliciter junctis, transversim confertissime striolatis, penultimo sensim attenuato; apertura ovata, intus castanea, peristomate modice expanso, undique libero, albescente, plica supra crassa, ad marginem aperturæ continua, columellari immersa, tenui, valde oblique intrante; plicis palatalibus six, prima longissimima, unam mill. a margine suturali distante, ceteris multo brevioribus, subæqualibus, modice curvatis atque fere æquidistantibus.

Var. *brevis*, exquisite fusiformis, vide fig. 6 et 6a; long. 24, lat. 6·2, apert. cum perist. 6 longa, 4·5 m.m. lata.

Var. *elongate fusiformis*, vide fig. 5; long. 26·3, lat. 6·2, apert. 6·9 longa, 4·7 m.m. lata; in hoc specimine apertura exceptionaliter longa est, in speciminibus alteris, forma similibus, longitudo aperturæ 6·2 ad 6·4 observanda.

The Trustees on the part of the Society were Mr. W. S. Atkinson, Mr. H. F. Blanford, Dr. F. Stoliczka and Col. J. E. Gastrell, who is to hold the office during the period the Superintendent of the Geological Survey continues President of the Society.

Finance.

The actual total receipt by subscriptions from members during the year under review amounts to Rs. 7,551, against Rs. 8,516 of the previous year. The amount due from members on account of subscriptions is Rs. 5,685 against Rs. 5,200 of the previous year and the Council would again earnestly urge on members the importance of punctual payments of their subscription, and the early paying up of all arrears.

The following table exhibits an abstract of the accounts for 1872.

ACTUAL INCOME DURING 1872.

Subscriptions,	Rs. 7,551	0	0
Admission fees,	768	0	0
Publications,	1,276	8	9
Library,	277	2	0
Secretary's office,	19	11	0
Vested Fund,	108	14	0
Sundries,	748	14	3
			<hr/>
	Rs. 10,750	2	0

Balance in the Bank of Bengal,	2,236	5	7
Cash in hand,	216	14	3
			<hr/>

Rs. 13,208 5 10

EXPENDITURE DURING 1872.

Publications,	Rs. 6,703	8	2
Library,	1,344	4	3
Secretary's office,	2,520	0	1
Vested Fund,	0	4	4
Building,	853	7	3
Coin Fund,	135	11	0
Sundries,	784	10	3
Balance in the Bank of Bengal,	767	9	4
Cash in hand,	148	15	2
			<hr/>

Rs. 13,208 5 10

The expenditure for 1872 has slightly exceeded the estimate, but has been considerably in excess of the income as will be seen from the following table.

	INCOME.		EXPENDITURE.	
	Estimate.	Actual, 1872.	Estimate.	Actual.
Subscriptions,	8,500 0 0	7,571 0 0	0 0 0	0 0 0 *
Admission fees,	1,000 0 0	768 0 0	0 0 0	0 0 0
Publications,	1,500 0 0	1,276 8 9	5,000 0 0	6,703 8 2
Library,	250 0 0	257 2 0	2,150 0 0	1,344 4 3
Coin Fund,	0 0 0	0 0 0	100 0 0	135 11 0
Secretary's office,	0 0 0	19 11 0	3,000 0 0	2,520 0 1
Building,	0 0 0	0 0 0	1,000 0 0	853 7 3
Sundries,	800 0 0	793 5 3	800 0 0	709 8 3
Rs....	12,050 0 0	10,685 11 0	13,050 0 0	12,266 7 0

The following is the estimated income and expenditure for 1873.

ESTIMATED INCOME FOR 1873.

Subscriptions,	Rs. 7,500 0 0
Admission Fees,	750 0 0
Publications,	1,200 0 0
Library,	250 0 0
Sundries,	750 0 0
Coin Fund, Secretary's office, Building,	0 0 0

Rs. 10,450 0 0

ESTIMATED EXPENDITURE.

Subscriptions,	Rs. 0 0 0
Publications,	3,050 0 0
Secretary's office,	2,000 0 0
Sundries,	800 0 0
Building,	1,000 0 0
Coin Fund,	0 0 0
Library,	3,000 0 0

Rs. 10,450 0 0

* For further particulars see Appendix (1).

† This does not represent the actual cost of the Library for the year. It is for keeping the Library establishment and for binding books, but the greater portion of the periodicals are lying unbound for want of sufficient funds. The cost of books purchased from Messrs. Williams and Norgate and Trübner is represented under liabilities.

Library.

The Library received, in 1872 an addition of 859 volumes or parts of volumes. The greater portion of this addition is made up by donations from the Government and by exchanges with other Societies.

In order to increase the usefulness of the library lists, the Council have directed that an abstract of the titles of articles in the various journals and other works received by the Society, likely to be of interest to the members of the Society, may be printed in the Proceedings.

The collection of MSS. received an addition of 104 Sanskrit MSS. purchased by Bābū Rājendralāla Mitra and 4 MSS. copied for the Society.

The Photographic Album of the Society has received 2 photographs of Lushai arms and utensils from the Surveyor General's Office.

The English Agency of the Society has been transferred to Messrs. Trübner and Co. in place of Messrs. Williams and Norgate.

The want of proper accommodation for the Society's Library continues to be very severely felt and the Council fear that under the present state of things it will be in vain to hope for any increase in its prosperity or in the enlargement of its scope of usefulness. In reply to the application to Government for the sum of Rs. 400 monthly to cover the rent of the Society's house during the occupation of the present Building by the Indian Museum, the Society has been informed that the matter is under the consideration of Government, but it is confidently hoped that a favourable reply will soon be received.

Coin Cabinet.

During the year 19 silver, several Bactrian copper coins and 8 tin coins have been received as donations from members of the Society and others. 29 silver Bactrian coins have been purchased at Rs. 110 by the Society.

Journal.

About 400 pages of the Journal, Part I, have been printed during the year, and they have been illustrated by 16 lithographic plates. 300 pages of Part II have been published with 11 plates, and 212 pages of the Proceedings with 3 plates. The size of the Journal has been increased and the additional cost of the change has added considerably to the expenses under this head.

Bibliotheca Indica.

The Council have the pleasure to announce that the progress made in the publication of Oriental works during the past year has been in every respect satisfactory. The work done comprises 18 fasciuli of Sanskrit works, 6 fasciuli of Persian works (including a double number) and 3 fasciuli of translations from the Persian.

SANSKRIT.

* The eighteen fasciculi of the Sanscrit Series comprise portions of eleven different works ; four relating to the Sama Veda, three to the Yajur Veda, two to the Atharva Veda, and one each to the Smṛiti and Chhandas.

Professor Mahesachandra Nayayaratna has completed the 4th volume of the Sāhita of the Black Yajur Veda, and is now employed on the fifth. The work comprises eight books, of which the first was edited by the late Dr. Roer, the second by Professor Cowell, and the major portion of the third by the late Paṇḍit Rāma Nārāyaṇa Vidyaratna, on whose death the present editor took the work in hand. The last three books are short, and it is expected that one volume more will complete the undertaking.

Bābu Rājendralāla Mitra has brought to a conclusion his edition of the Taittiriya Aranyaka, on which he had been engaged for the last seven or eight years. It extends to 928 pages of text, 77 pages of Introduction, and 56 pages of a Table of Contents. The Introduction gives a complete analysis of the work in English, and the Table of contents notices the subjects of the mantras seriatim.

The Gopatha Brāhmana of the Atharva Veda, which was originally undertaken by the late Paṇḍit Harachandra Vidya Bhushana, and on his death made over to Babu Rājendralāla Mitra, has also been completed. The editor has added to it an introduction in which the native characters and contents of the treatise have been described at length. The Babu has likewise completed his edition of the Pratisakhya of the Black Yajur Veda. An English translation of the work by Professor Whitney having already appeared, it has not been deemed expedient to attach to this edition an Analysis in English.

The Srauta Sutra of Sātyāyana has likewise been completed, and its editor Paṇḍit Anandachandra Vedānta Vāgisa is now engaged on the last fasciculus of the Tāndya Brāhmana of the Sama Veda, which, it is expected, will be completed in a short time.

The Society's edition of the Pingila Chandra Sutra and of the Atharva Upanishad of which one and two fasciculi, respectively, have been published, are also in a forward state, and will be brought to a conclusion during the current year.

The same cannot, however, be said of the Sama Veda Sāhita and of Chaturvarga Chintāmalā of Hinaṇḍari. Of the former, altogether five fasciculi have been published, and this brings up the work to the middle of the 3rd chapter, or about one-fifth of the whole. The task is a difficult and troublesome one, and several years must elapse before it will be brought to a conclusion. Of the latter, the first out of its four parts will be completed during the current year.

It has been observed by some European scholars that the works undertaken by the Society are not rapidly brought to a conclusion, and the great delay which has taken place in the printing of some of the works, to a certain extent, justified the complaint. But the voluminous nature of those works and the little time which can be devoted to their printing by the several editors engaged, who have all onerous official duties to discharge, render it impossible to press on our publications faster. The necessity of undertaking several works at the same time also apparently swells the list of incomplete works. Mutations in Indian society, so much more rapid than in Europe, and death, have likewise had much to do in checking progress; but on the whole, the Council is satisfied that, bearing in mind the large number of works which are in the press, and the limited resources at command, the Bibliotheca is progressing as rapidly as could be expected.

PERSIAN SERIES.

Of the Persian series, Mr. H. Blochmann has issued two fasciculi of the text of the *Āin i Akbari* (Fasc. XIV and XV). Fasc. XV completes the text of vol. I (600 quarto pages), and contains the first portion of an Index of about 4,500 geographical names of Upper India. About three fasciculi more will complete the text edition. He has also issued one fasciculus of the translation (Fasc. VI).

Maulawī Zulfakār 'Alī has issued three numbers of the *'Farhang i Rashīdī*. The first volume of this critical dictionary of the Persian language is now completed.

Maulawī 'Abdurrahīm, of the Calcutta Madrasah, has issued a full index of names of persons and geographical names occurring in the Society's edition of the *Pādishahnámah*. The index fills a double number, and renders, in the absence of a translation, the large work on Sháhjahán's reign more accessible. No work will in future be issued without carefully prepared indexes, and steps have been taken to prepare indexes to works issued in former years. The index to the *'Ālamgírnamah* by Maulawī 'Abdul Hai is about to be issued, three forms only being wanting. Maulawī Agha Ahmad 'Alī has his index to the *Maásir i 'Ālamgírí* in press. Maulawī 'Abdurrahīm has commenced the index to *Kháfi Khán*.

Two new works of importance have been commenced during last year, the text edition of the *Akbarnámah*, and the English translation of the *Tabaqát i Náqirí*.

The *Akbarnámah* by Abulfazl is the greatest historical work that India has produced. It consists of three volumes, the first of which treats of the Timurides, up to the death of Humáyún; the second volume contains the most detailed account of Akbar's reign till 1011, A. H., when Abulfazl, at Jahángír's instigation, was murdered by Rájá Bir Singh Bundelá of U'rbeh; and the third volume is the *Āin i Akbari*. The edition

will also include the continuation of the Akbarnámah by 'Ináyatullah Muhibb 'Ali from the time of Abulfazl's death till the end of Akbar's reign (1014). Maulawí Aghá Ahmad 'Alí of the Calcutta Madrasah has been appointed to edit the work, which will be issued in the same size and type as Mr. Blochmann's *Áin*. Two fasciculi have been printed. The edition is based upon nine MSS., belonging to the Society, the Fort William College, the Delhi MSS., and Maulawí Kabíruddin Ahmad.

The other new work is the translation by Major H. G. Raverty of the *Ṭabaqát i Náqirí*. This work is being printed in England by Major Raverty himself. Two fasciculi were printed during the last year, and a portion of them will within a short time be received for distribution in this country. Major Raverty has sent the following report on the progress of his works.

'I have much pleasure in stating, for the information of the Council of the Society, the progress I have made in translating the *Ṭabaqát i Náqirí*, and other matters connected therewith.

'When I first offered a translation to the Society, as stated in my letter on the subject, I intended merely to have made a fair copy of a translation I had made of the portions relating to India, in connection with my own particular studies in Muhammadan and Indian History, which I have been engaged in for the last eight or ten years—from the Society's printed edition of the text, edited by Lient.-Col. W. N. Lees, LL D. and his Maulawís, and a MS. in the India Office Library, which MS. and that belonging to the Royal Asiatic Society appear to have been the copies from which the printed text was taken, which printed text, in many places, is unintelligible and does not correspond with those MSS.

'Having, subsequently, discovered a very old copy of the text, and seemingly far more reliable, although defective at the end, and like all MSS. more or less defective in a few other places, on comparing it with the other named above, I found such considerable and important differences to exist between them, that I determined—even without "*training a staff*" for the purpose—to go over the whole translation again.

'Our friend, Mr. Arthur Grote, to whom I am greatly indebted for assistance in many ways, also advised that I should avail myself of any other copies of the text that might be procurable.

'In the preface to the printed text, the editor remarks—"When I commenced the work, we had three copies [of the Persian text], one belonging to the Royal Asiatic Society, one on the India House Library, and one to the High Priest of the Parsís at Bombay. A little while afterwards, Colonel Hamilton, in reply to a circular of the Society, forwarded a copy from Dehli. These MSS. are all apparently good old copies, and are written in very different hands. It was supposed, then, that we had four distinct copies to collate; but before long, it became apparent that the four had

been copied from two MSS., so, in reality, we had only two * * *. The Society had issued hundreds of circulars to all parts of India, and had failed to draw out more than two copies; and the fact that the four old copies I had, had been copied from two MSS. seemed to indicate so clearly the great scarcity of MSS. of this work, that I decided to go on."

'The editor's remarks are perfectly correct with regard to the India Office Library MS. and the Royal Asiatic Society MS.; for the mistakes contained in the former, are repeated in the latter exactly, even where two or three pages of the history of Mas'ûd of Ghaznî are inserted in the account of the Saljûqs.

'Mr. Morley also mentions the *Tabaqât* as "a work of rare occurrence;" but, however scarce in India, it is not so in Europe.

'On instituting inquiry, I found the Bodleian Library possessed one copy, and that there were two others in the British Museum. These were not to be procured on loan, and there was no other course for me to adopt than to proceed to Oxford and to London, to collate them, although I somewhat doubted whether it would be well to put the Society to the expense attending these journeys; but Mr. Grote strongly advised me to do so. I first collated the Bodleian MS., a tolerably good copy, from Section VII, where I commence my translation, to the end of the work, line for line, and word for word. This completed, I went to London and collated the British Museum copies—one, a very good one: the other, ordinary—in the same manner, and completed that task also. Altogether these labours occupied six weeks; and I regret to say that my sight has suffered in consequence.

'Having done this, I set to work; and six of the sheets were put in type, when our energetic friend, Mr. Grote, obtained the Hamilton MS., which copy of the text the Earl of Crawford and Balcarres was so very kind as to place at our disposal for six months; and, although it is not a very good copy, and defective at the end, it has been very useful. In the meantime, we had endeavoured to obtain the loan of two copies in the Paris Library, as it was impossible for me to go there to collate them; but after considerable delay, the favour was refused, on the plea that one was an *autograph* of the author's, and, therefore, could not be lent, and, that it would not be advisable to lend works of the kind to be taken out of Europe! I shall have something to say respecting this "autograph" hereafter, as I think I can put my hand upon three or four "autographs," equally authentic. I have had no difficulty, however, in obtaining collations, from those MSS., of passages which were at all doubtful, through the great kindness of M. Garcin de Tassy and M. Zotenberg. I find that they are, by no means, the most correct copies, and that even the "autograph" contains similar blunders to those of the India Office Library, and the Royal Asiatic Society's MSS., and likewise, the very great blunder of the author, which

occurs in every copy collated, which I have noticed at pages 160 and 165 of my translation.

At this time also, I heard from His Excellency State Counsellor Von Dorn, that the Imperial Public Library of St. Petersburg contained a copy of the text, and the Imperial Academy of Sciences, two copies; and, that, without doubt, I could obtain them on loan. I applied to His Grace, the Secretary of State for India for aid, which was graciously granted; and, through Lord Augustus Loftus, British Ambassador at the Russian Court, the Imperial Russian Government, in its proverbially enlightened manner, at once, most graciously, complied with my request; and the three MSS. were, without delay, placed at my disposal, the first for three and the last for four months.

The Imperial Public Library MS., from all appearances, is, probably, even more ancient than the copy I have referred to in the third para. of this communication, for it is written in the style Mullis generally write, although correctly written. The *dâls* are marked with a diacritical point, and other letters are written in a peculiar manner denoting considerable antiquity. If either copy has a claim to be considered an "autograph," this is the one best entitled to it; but I am sorry to say that it wants great part of Section XVII, and all the succeeding Sections. One of the Imperial Academy's copies is a modern one, comparatively, but still exceedingly useful; but the other, only a little defective in one or two places, and at the end of the last Section, is an exceedingly good one, and is also of considerable antiquity.

Having been so fortunate as to obtain these MSS., I determined to make the most of them, and also of Lord Crawford's MS., and laying aside the translation for a time, I collated these four copies, word for word, with the printed text [a specimen, after collation, I have sent to Mr. Grote to look at]; and with constant application, I completed that laborious task, and returned the MSS. within a day of the prescribed time.

I found such difference to exist between the two best Petersburg copies, and the others, that I deemed it my duty not to have the proofs struck off, until I had made the corrections and emendations, which, as shown by them, were absolutely necessary: hence the extra cost of corrections for the first six sheets of the translation, which the Honorary Secretary has noticed in his letter, No. 365 of November 8th, 1872. This extra cost, I regret; but, I hope I shall be considered justified in adopting the course mentioned.

As to the printed text I must say, with regret, but conscientiously, that it is almost useless: there is scarcely a correct page in the book. But, when I consider that it was taken from two very incorrect copies of the original, it is not to be wondered at, and it was impossible it could be other-

wise. Even as it is, after collating so many copies, the editing and reprinting of a correct text would be, by no means, a light or an easy task.

‘It will be observed that I have commenced the translation from Section VII., and from that Section, it will embrace the whole work. The first six contain—I, an account of the Prophets, Patriarchs, etc., the ancestors of Muhammad, and his life; II., III., IV., the history of the Khalifahs; and VI., the kings of Yaman. All these are of very little importance. The Vth Section is somewhat more important, and relates the history of the early Persian kings, but also contains so many errors, that a volume might be filled with notes to correct and explain it, and, therefore, I determined to omit it. I can give a brief resumé of the contents of those Sections to precede Section VII., on completing the translation.

‘My references to Elliot’s India are not directed, of course, to the whole of that work, but, merely to those portions of the *Ṭabaqat i Nāqir* contained in it, which appear to have been taken chiefly from the printed text, and consequently very considerable differences will be found to exist between that translation and mine, which I have endeavoured to make available for the general reader, and not for scholars alone.

‘I do not expect there will be many typographical errors—even of a minor nature—but of such as may be found to have crept in, I will, on completion of the work, give a list, with the Index and title page.

The long and unctuous adulations addressed to, and the constant prayers offered for, the “Sulṭān of the Sulṭāns of both Turk and ‘Ajām,” to whom the author dedicated his work, have been generally omitted or greatly reduced, and some of the introductions to Sections also, which are in a similar style, have been cut short, but in all other cases, I have not “compressed” the translation in the least degree, and I may say that I have weighed every word and sentence, and have omitted nothing, not even the poetical quotations. I may have to compress some of the longer poetical extracts, if of no particular merit or interest, but not otherwise.

‘I have noticed a very remarkable difference in the mode of expression in scores of places—the signification the same, but so very differently expressed—so much so, indeed, as to give one the idea that the Persian text must be a translation from another language. I have only space to mention this briefly now, but hope to do so in my prefatory remarks to the whole work, when complete.

‘Although the notes are numerous, and some somewhat long, I think it will be found that they were necessary to correct the author’s incorrect statements, and the serious blunders he often makes. I may truly say “I have neither spared time nor labour, in endeavouring to make the translation acceptable to the Society and the public.

• ‘I cannot close this report without referring, briefly, to the kindness

and assistance I have hitherto received from various scholars ; and trust, when my labours shall have been brought to a close, to acknowledge them more particularly, and in suitable terms.'

The following are the names of the Sanskrit works issued during the last year—

The Sañhitā of Black Yajur Veda, with the Commentary of Mādḥava Achārya, edited by Paṇḍit Mahēsa Chandra Nyāyaratna, Nos. 229 and 230. Fasc. XXV and XXVI.

The Sāma Veda Sañhitā, with the Commentary of Śūyana Achārya, edited by Satyavratā Sāmasrami, Nos. 244 and 251, Fasc. IV and V.

The Chaturvarga Chintamāṇi by Hemādri, edited by Professor Bharata-chandra S'iromani, Nos. 245, 257 and 262, Fasc. IV—VI.

The Gobhilya Grihya Sutra with a Commentary by the Editor, edited by Paṇḍit Chandrakānta Tarkalānkār, No. 241, Fasc. III.

The Gopātha Brāhmaṇa of the Atharva Veda, edited by Bābu Rājendralāla Mitra, No. 252, Fasc. II.

The Atharvāna Upanishads with the Commentary of Nārāyaṇa, edited by Rāmamaya Tarkalānkara, Nos. 249 and 265, Fasc. I and II.

The Taittirya Prātisākhya with the Commentary entitled Tribhāshya-gatna, edited by Bābu Rājendralāla Mitra, Nos. 253 and 259, Fasc. II and III.

The Tāndya Mahābrāhmaṇa with the Commentary of Śūyana Achārya, edited by Paṇḍit Anandachandra Vedāntavāgīśa, Nos. 254 and 266, Fasc. XVII and XVIII.

The Chhandas Sūtra of Pingala Achārya with the Commentary of Itala-yudha, edited by Paṇḍit Viś'vanātha Śāstri, No. 258, Fasc. II.

The Srauta Sūtra of Lātyāna with the Commentary of Agni Svami, edited by Paṇḍit Anandachandra Vedāntavāgīśa, No. 260, Fasc. IX.

The Taittirya Aranyaka of the Black Yajur Veda with the Commentary of Śūyana Achārya, edited by Bābu Rājendralāla Mitra, No. 263, Fasc. XI.

The following are the Persian works issued during the last year—

The Ain i Akbari by Abul Fazl i Mubārak i 'Allāmi, edited by H. Blochmann, M. A., Nos. 248 and 264, Fasc. XIV and XV (partly index).

The Farhang i Rashidi by Muḥammad Abdur Rashid of Taftah, edited and annotated by Maulawī Zulfāqār 'Alī, Nos. 250, 255 and 266, Fasc. VI—VIII.

The Index to the Pādishānamāh by Maulawī 'Abdur 'Rahīm, No. 261 (double number).

Translations.

The Ain i Akbari of Abul Fazl i 'Allāmi, translated in English by H. Blochmann, M. A., No. 247, Fasc. VI.

The Tabagát i Náqirí of Sirájuddín Minháj, translated into English by Major H. G. Raverty (printed in England) Fasc. I and II.

Officers.

The duties of the Secretaries were performed by Dr. F. Stoliczka and Mr. Blochmann till June, when Captain J. Waterhouse was appointed General Secretary and has since that time edited the Proceedings, conjointly with Dr. Stoliczka and Mr. Blochmann, who have retained charge of the Natural History and Philological parts of the Journal respectively.

The office of Financial Secretary and Treasurer was held by Col. J. F. Tennant till the month of February when Col. Gastrell resumed charge of it.

The Council have again much pleasure in recording their satisfaction with the good services of the Assistant Secretary, Bábu Pratapchandra Ghosha, B. A., they have also favourably reported on the work done by Bábu Manilál Baisak, Assistant Librarian, Sayyid Waliullah, store-keeper, and Babu Buddinath Baishak, Cashier.

LIST OF SOCIETIES AND OTHER INSTITUTIONS WITH WHICH EXCHANGES OF PUBLICATIONS HAVE BEEN MADE DURING 1872.

Batavia :—Société des Sciences des Indes.

Berlin :—Royal Academy.

Birmingham :—Institution of Mechanical Engineers.

Bombay :—Royal Asiatic Society.

Boston :—Natural History Society.

Bordeaux :—Bordeaux Academy.

Buenos Ayres :—Public Museum.

Bruxelles :—Académie Royale des Sciences, &c., de Belgique.

Cherbourg :—Société Impériale des Sciences Naturelles.

Calcutta :—Agricultural and Horticultural Society of India.

———— :—Tattvavodhini Sabhá.

———— :—Geological Survey of India.

Christiania :—University.

Dacca :—Dacca News and Planters' Journal.

Dera :—Great Trigonometrical Survey.

Dublin :—Royal Irish Academy.

———— :—Natural History Society.

Edinburgh :—Royal Society.

Lahore :—Agricultural Society of the Panjab.

• Leipzig :—Deutsche Morgenländische Gesellschaft.

• Liège :—Société Royale des Sciences.

London :—Royal Society.

———— :—Royal Asiatic Society of Great Britain and Ireland.

- London :—Royal Institution.
 — :—London Institution of Civil Engineers.
 — :—Royal Geographical Society.
 — :—Museum of Practical Geology.
 — :—Zoological Society.
 — :—Statistical Society.
 — :—Geological Society.
 — :—Linnean Society.
 — :—Athenæum.
 — :—Anthropological Society.
 — :—Nature.
 — :—Royal Astronomical Society.
 Lyons :—Agricultural Society.
 Moscow :—Société des Naturalistes.
 Munich :—Royal Academy.
 Madras :—Government Central Museum.
 Manchester :—Literary and Philosophical Society.
 New York :—Commissioners of the Department of Agriculture.
 New Haven :—Connecticut Academy of Arts and Sciences.
 Netherlands :—Royal Society.
 Paris :—Ethnographical Society.
 — :—Geographical Society.
 — :—Asiatic Society.
 Stettin :—Entomological Society.
 St. Petersburg :—Imperial Academy of Sciences.
 Stockholm :—Royal Academy of Sciences.
 Vienna :—Imperial Academy of Sciences.
 — :—Anthropological Society.
 — :—Zoological and Botanical Society.
 — :—Imperial Geological Institute.
 Washington :—Smithsonian Institution.

On the motion of the President, the report was unanimously adopted.

The scrutineers then announced the elections of Officers and Members of the Council for 1873, as follows :

T. Oldham, Esq., LL. D.,	<i>President.</i>
Bábú Rájendralála Mitra.	
The Hon'ble E. C. Bayley, C. S., C. S. I.	<i>Vice-Presidents.</i>
The Hon'ble J. B. Phear.	
Dr. F. Stoliczka,	<i>Secretaries and Treasurers.</i>
H. Blochmann, Esq., M. A.	
Captain J. Waterhouse,	
Col. J. E. Gastrell.	

Bábu Rájendralála Mitra.
 The Hon'ble Sir R. Couch, Kt.
 T. Oldham, Esq., LL. D.
 Dr. F. Stoliczka.
 H. Blochmann, Esq., M. A.
 The Hon'ble J. B. Phear.
 Col. H. L. Thuillier, R. A., C. S. I.
 J. Wood-Mason, Esq.
 Captain J. Waterhouse.
 Col. H. Hyde, R. E.
 The Hon'ble E. C. Bayley, C. S., C. S. I.
 Rajah Jotendramohan Tagore.
 W. L. Heeley, Esq., C. S.
 L. Schwendler, Esq.
 Col. J. E. Gastrell.

Members of Council.

Colonel Thuillier said—"With reference to the Annual Report which we have just heard read, I think it will be apparent to the meeting, that the Society is greatly indebted to our worthy office-bearers, the Secretaries and Treasurer, who have so persistently devoted their time and talents to the interests of the Society. Whether we look at the remarkable punctuality with which the Journal of the Society is published, or consider the various ways in which the Secretaries maintain the reputation of the Society, and the Treasurer our financial interests, our warmest thanks are eminently due to these gentlemen.

"It is right to remind the meeting that the sole reason of Captain Waterhouse being appointed General Secretary was to relieve Messrs Blochmann and Stoliczka of some part of their various duties, at their own special request, in order that they might be better able and have more time to attend to their respective departments in the Philological and Natural History branches, which they still so admirably fill. By the valuable assistance of my excellent friend, Captain Waterhouse, I have no doubt the various duties of editing the Journal and other matters connected with the Society will be even better performed than heretofore.

I have therefore great pleasure in proposing a cordial vote of thanks to Messrs. Blochmann, Stoliczka, and Captain Waterhouse, the Secretaries, and Col. Gastrell, Treasurer."

The proposal was seconded by Dr. Waldie and carried unanimously.

The following gentlemen were elected to audit the accounts for 1873: Messrs. L. Schwendler and F. W. Peterson.

The President then read the following address.

PRESIDENT'S ADDRESS.

GENTLEMEN,—Another year has passed, and the recurrence of our anniversary reminds us of the propriety of taking stock of our progress, and ascertaining our exact position.

It will be needless to repeat the numbers so clearly given in your Council's report, or to detail the various changes in resident and non-resident members. It will be sufficient to refer to these details, and to state the broad result that the Society is not, pecuniarily, quite as well off as at the close of last year, that the amount of subscriptions realized has not come up to the estimate, and that the year has closed, leaving charges against the income of the Society for 1873, which properly should have been paid out of the income for 1872. We fear that this will continue to be the result of the working of the Society so long as we are huddled together into the corner of our noble house, without room even to store our books, and with all our property deteriorating rapidly, from the impossibility of properly attending to it.

The Society is fully aware from the addresses of previous Presidents, that we hold that we have a just claim for redress of these wrongs and injuries as against the Government of the country who, voluntarily and in the most solemn manner supported by all the formalities of a regular act of the legislature entered into a contract with the Society to provide ample accommodation for that Society on a certain date, the Society meanwhile allowing the collections, which they handed over to the care of the Government officers for the public benefit, to remain in the house they then occupied, and still occupy. This house and grounds are the undoubted property of the Society—
 • they are in no way whatever subject to the control of Government in any one of its departments. And the Society has therefore from the date settled in the contract I have alluded to, been deprived of the rent which they could have at once realized for this house, from that date up to the present time, and they have further been mulcted, by the non-performance of their part of the contract by the Government of the country to the extent to which their property has been left so long without repair, and without renewal, which could not be satisfactorily done while crowded with collections, until now portions of it are unsafe, and in any case the serious cost of repair will absorb a very large sum. This just claim for the payment of a rent for the House they have occupied, for years after the stipulated time, had been as you are aware submitted to Government. The Society has not received a definite reply although more than two years have elapsed. The Council of the Society have endeavoured in every justifiable way to smooth the

path to a settlement, and more recently they have preferred to let the matter rest without further movement, because they felt so thoroughly convinced of the strict justice and unquestionable correctness of their claim, that they felt certain that time alone was requisite for a favourable solution of the difficulty. This claim is so strong that its strict legality has been maintained by several of the Judges of the High Court of Judicature, and to maintain it, in a legal way, it was only necessary to close our doors and to refuse the use of our house and so prevent the destruction caused by the hundreds which daily throng its halls. But, as I have said, the Council preferred endeavouring to obtain their just rights by quiet efforts to maintain the position of the Museum, while not in the least abandoning their claim. *This they never will abandon*; they seek no grant-in-aid of their efforts in promoting the spread of knowledge in the country, although this also they might fairly expect to receive; they ask no dole of charity to help out their existence, though the grant of such assistance would but honor the giver more than the recipient, for science has ever been the best handmaid of Government. But we maintain a just claim to the payment of certain sums, due to us under a solemn contract, and fairly and properly earned as it were by the Society, by the noble collections which they had brought together and maintained, even often at the risk of their own existence, and which they handed over for the public benefit. Surely the public is bound to acknowledge this value received!

Let us look at it in another light. What was the value of the collections handed over! It is almost impossible to put a money value on collections of this kind. The number of specimens gives no clue to it, their value depends much more materially on other considerations. Our collections contained all the typical and original specimens of Blyth's wonderful contributions to the Natural History of this country, those of Bryan Hodgson in numerous departments, many of Jerdon's specimens, many of Buchanan Hamilton's; large series contributed from other countries identified by the original describers and contributors. It contained a noble series of Sewalik fossils all of which had been carefully examined by Dr. Falconer himself, and carefully catalogued. And it also contained a very extended collection of objects representing the fauna of this country from various sources. Such a collection could not have been obtained anywhere else for any money. And I have no hesitation in saying that had it been put into the market and offered for sale, it would have readily realized a sum of two and a half lakhs of rupees. Take even less than this sum at five per cent., and the Society would have had an income of 10,000 Rs. per annum, or more than 800 Rs. per month! And this I would add, with their house unincumbered and free for the prosecution of their own immediate objects. Gentlemen, it may suit the views of some who seek possibly the aggrandizement of their own position, or to

enlarge upon their own contributions to such collections, to depreciate the value of the Asiatic Society's collections. But I speak with a full knowledge of the feeling of true naturalists, and true palæontologists, when I say that such a storehouse of the accumulated facts of generations, such an accumulation of original species, of the absolute labours of the great workers in the Natural Sciences, was simply invaluable.

Gentlemen, I have dwelt upon this subject, although for many reasons I would have greatly preferred to pass it over in silence, because I have been made aware that a most erroneous, and strangely erroneous, idea prevails in certain places, that the Government of the country contributes largely towards the Asiatic Society's support. It is needless to tell you, as the members of the Society, that this is not so; that we do not in fact receive one single pice of the public money as income of the Society, and have not for many years past. We acknowledge with thankfulness the liberality with which on some occasions, when special wants were represented, the Government have aided the Society, but none of these have occurred for years past. We acknowledge that for years when unwilling to adopt other and better means of exhibiting to the people of this country the resources of the land in which they dwelt, the Government maintained, at a rate of remuneration on which a decent clerk in an office would be supposed to starve, a Curator to take charge of collections to which the Society gave, free of all charges, room for exhibition and study, and also contributed the same small stipend to the support of a man of wide European reputation, and who had devoted a lifetime to the Natural History of the country. But contributions to the Society, for the objects of the Society proper, there have been none.

A sum of 6,000 Rs. per annum is now passed through the hands of the Society as Trustees for the publication and issue of the *Bibliotheca Indica*, a noble and invaluable series of the standard vernacular literature of the country; and one which well repays the limited outlay of 600£ a year. But the grant of this sum gives not one pice to the Society. It gives a very large amount of trouble, anxiety and responsibility, which are voluntarily borne by the Philological Committee and Council of the Society, rewarded only by the consciousness that they are doing good. But as I have said, not one fraction of this grant goes to the Society. The accounts are kept most strictly separate, as any one can satisfy himself by a mere reference to the accounts of the Society.

I refer also to this for another reason because I find in some Statistical returns of Educational and Scientific institutions recently issued by the Government of Bengal, the Asiatic Society is set down as possessed of an 'endowment' of 100 Rs. per year. Now the facts of this were fully explained to the compiler of the tables, and I cannot understand how with

these facts before him, this statement should have been allowed to go to the public. This so-called endowment, gentlemen, is the interest on a few thousand rupees which the Society itself has invested in the funds of the country, the result chiefly of accumulated entrance fees of its members. It is just as clearly a part of the ordinary income of the Society as is the subscription which I, as an ordinary member, am called upon to pay annually, and can be dealt with by the Council in exactly the same way. It would indeed be well for the Society if it had an endowment even of small limits. And we shall feel indebted to the author of the tables or any one else, if he will establish such an endowment. But when such does not exist, the statement of it is likely to lead to serious misapprehension of the position of the Society.

We rest, therefore, in the perfect confidence that the just and undoubted claim of the Society for remuneration for the heavy damages inflicted on the Society by the continued occupation of their premises and the consequent depreciation of their property,—in addition to the injury done by keeping the Society in a position in which it can hope for few additions to its numbers, and can offer but little advantages to its working members,—that this claim will be acknowledged without further demand, and that the Society will be freed from the heavy incubus under which it now rests.*

During the year, the Society has lost by death eight ordinary, one honorary and one corresponding member. Among these were some distinguished in the ranks of science, and long supporters of our Society.

The year had scarcely opened, when we were, in common with every well-wisher of the country, stunned by the fearfully sudden and awful death of the Viceroy, our Patron. It was not within the scope of the Asiatic Society's objects to discuss the many political questions which had more immediately engaged Lord Mayo's attention, but we could not fail to appreciate the earnest and thorough heartiness of Earl Mayo's character, or to feel profound regret at his being cut off in the very height of a successful career by the hands of an assassin.

Lord Northbrook, his successor, has been pleased to accept the office of Patron of the Society, left vacant by Lord Mayo's death.

* It is with the sincerest pleasure, that I am able to stop the printing off of these pages, and announce that the Government of India have, after careful consideration, acceded in full to the claims of the Society. This is peculiarly gratifying, to the Council of the Society, who have found themselves in the painful position of apparent opposition to the Government of the country, while, after the calmest and most unprejudiced consideration they could give to the subject, they found their convictions of the justice of their claims so strong that they were unable to retreat one single step. They feel, therefore, most thankful that any further difference of opinion has been thus removed.

. In Dr. Jerdon, the Society has lost an old and well-tried friend and fellow-labourer. It is now more than thirty years since his 'Catalogue of the birds of the Peninsula' was published in the Madras Journal for 1839. And the numerous papers which he has since published in that Journal and in the Journal of our own Society shew that his interest in this subject had never ceased. His 'Illustrations of Indian Ornithology' was among the earliest attempts at proper coloured figures of Indian Birds. His labours may be said to have culminated in his well known and oft quoted 'Manual of the Birds of India,' followed by his 'Game Birds of India.' Even after he had retired from active service, and left the country, his first desire was to publish a supplement to this valuable work, which he largely succeeded in doing by a series of papers in the 'Ibis.' Indeed it is a proof of how entirely his heart was wrapped up in the subject, that he was talking with his friend, Drescher, of the 'Birds of India' until within a few hours of his decease, not conscious of the danger that was impending over him.

Nor did he, while thus devoting his attention chiefly to birds, neglect the other classes of Vertebrata. He had conceived the noble idea of furnishing students of Indian Natural History with monographs of each of these classes, which he accomplished so far as the Mammalia were concerned. Reptiles also had engaged his earnest attention for years, and were the subject of an active and extensive correspondence with Gray, with Cantor, and Blyth. Our Journal contains a catalogue of the Reptiles of the Peninsula of India, which shews how desirous he was to attain accuracy in his determinations, and since the publication of the Mammalia and Birds he had been most assiduously collecting Reptiles, and indeed the first portion of his monograph on the Reptiles of India was actually printed. I should notice also his very valuable catalogue of Fishes, in the Madras Journal, while in a different branch of Natural History entirely, his descriptive account of the Indian Ants is one of the best yet published. He had contributed to Benson and Blanford many shells described by those writers, while many entomologists in India can point with satisfaction to valued specimens of beetles and butterflies for which they had been indebted to Jerdon's liberality. To all this range of natural knowledge he added a wide acquaintance with Botany and the plants of India, especially the ferns.

Most of this work had been accomplished while Jerdon was in active service with his regiment, and dependent on his own resources for books, specimens, &c. for comparison. Gifted with remarkable powers of conversation, and with his memory richly stored with anecdotes of others, and observations of his own, he was a charming companion, while his untiring energy, and keen sense of personal enjoyment, were absolutely infectious.

Jerdon has left behind him an immense store of valuable notes, and of coloured sketches from life, which we hope and trust may still be utilised.

With less originality perhaps than either Blyth or Bryan Hodgson, he has yet done more than any other individual for the Natural History of India, by his valuable Manuals. And it is much to be wished that the series may be completed and brought up to date by some of his successors. Dr. Jerdon was an officer of the Madras army, and although in the course of his military service he had visited parts of Central India, it was not till late in his career that he had an opportunity of visiting and enjoying the glorious scenery of the Himalaya, which he did with a peculiar freshness and keenness of delight.

Sir Donald McLeod was one of the oldest members of the Society. He joined our ranks in 1837, more than the third of a century since, and since that, has been an undeviating friend and supporter of the Society, taking the liveliest interest in every step that marked its progress, or that tended to improve our knowledge of the peoples of this country and their history. He was not an active contributor to our Journal, but was always an earnest supporter of science, and an able and disinterested adviser on all points. Of unbounded hospitality, which was exercised with a simplicity of courtesousness and thoughtful kindness, which led all to look to him as a friend, of the widest and purest sympathies, Sir Donald McLeod possessed the singular power of attaching to himself all with whom he came in contact; a power, which gave him a command over his fellow men, due rather to the influence of his individual character than to the grasp or power of his intellect. He was in fact a singularly loveable man, and will ever be remembered by those among whom he lived so long, and over whom he had exercised a benevolent sway for years, as a friend and benefactor. The Society will feel his loss as an earnest and enlightened promoter of sound education.

During the year we have also lost in Mr. C. Horne, C. S., a valued contributor of several Archæological papers to our Journal. He came to India at the age of 20 in 1843, and finally returned to England in 1869. He had been a member of this Society since 1863 up to the time of his death last year.

Colonel Sykes, whose connection with India dated almost from the very commencement of the century, had ever been an earnest cultivator of the Natural Sciences, and as Director of the East India Company a steady and warm supporter of every effort to promote the welfare of this empire. He had contributed to various journals many very excellent papers on the Geology, Ornithology and Meteorology of India.

From among our corresponding members, one name of high note has been removed by death. Theodore Goldstücker, who died in March 1872, at the early age of 51, was a native of Königsberg. He commenced the study of the Sanskrit under Professor von Bohlen, at an early age. He also studied the Hegelian philosophy under Rosenkranz. At Bonn, he continued his

studies under Schlegel and Lassen. His first publication was the *Prabodha Chandrodaya*, which appeared in 1842. He proceeded to Paris from Bonn and then became a pupil of Eugène Burnouf, and later he paid a short visit to England. In 1859 he was invited by Professor Wilson to come again to England and assist in the preparation of a new edition of his Sanskrit dictionary. He undertook the revision, but under his hands it became so vast an undertaking that only six fasciculi, containing the greater portion of the first letter, were published. A few years after his arrival in England, he was appointed Professor of Sanskrit at University College, London. In 1861, he published his essay on Pāṇini, as introductory to a facsimile edition of the *Mānava Kalpa Sūtra*. He also carried through the press for the Indian Government a photo-lithographic facsimile of the *Mahābhāṣya* which is nearly complete.

Dr. Goldstücker was elected a corresponding member of this Society in 1863.

A general review of the work done by the Society during the year will I think show that there has been no diminution of zeal, no want of earnest and thoughtful work.

The issue of the *BIBLIOTHECA INDICA*, which the Society have voluntarily undertaken to edit on behalf of the Government which supplies the necessary funds, has, on the whole, progressed very satisfactorily. I feel bound to allude to this subject rather more pointedly than otherwise I should feel justified in doing, because during the year some critical remarks have issued from the pen of one at least of the ablest orientalists of Europe. Prof. Weber in a review of the labours of the Society in connection with the *Bibliotheca Indica*, as extending from 1865 to 1870, acknowledges in a hearty manner the judicious selection of works for publication, and fully admits that the several editors, principally native scholars, have truly performed all that could have been at all expected from them. In truth, Professor Weber speaks only in terms of praise and approval, of the works selected and the mode in which they have been edited. But his objections are based, I may say almost solely, on the delays which have occurred in the issue of successive parts or fasciculi of various works which extend over many pages. Now, no one can be more thoroughly alive to the force of this objection than the Philological Committee of the Society, under whose special charge these publications are. But I fear Professor Weber's experience of the conditions of literary work of this kind in Europe, and in the midst of the learned centres of literary activity, where he resides, scarcely enables him to realize the almost unspeakable difficulties which accompany the effort here. There is not among the long list of editors of our *Bibliotheca*, one single person who has not heavy and continuous official duties to perform which occupy by far the larger portion of his time, and which give none of that literary ease, so essential to

the satisfactory pursuit of such studies. Heavy critical work requiring constant thought, and much accuracy of comparison can in this country only be taken up, after the mind and after the body too are fatigued and jaded. And the wonder really is, that so much can be done as has been, not that more has not been accomplished. And further, the conditions of society here which lead to much more rapid changes than elsewhere, tend to retard, if not altogether to interfere with or interrupt, the progress of such editions. In many cases, the editors who have commenced the publication of works in this valuable series, have been carried off by illness, and new editors had to be sought out. In some cases owing to these causes, successive portions of the same work have been entrusted to the care of three and four different scholars. Every such change inevitably involves delay. Time is required to seek out a new editor; he must fully acquaint himself with what has been done and what he is to continue and so months, and even years, pass over before the work can be satisfactorily resumed. I know of one case in our experience in which with all possible anxiety to publish as quickly as possible one of the most valuable remains in Hindi, the negotiation for editing the work has extended over years and nothing definite is, I believe, yet adopted.

But further, owing to the necessary delay in the transmission of these fasciculi to places in Europe, Dr. Weber, in common with others, complains of the irregularity with which the fasciculi are received. This is a grievance under which we suffer in this country quite as much as European scholars can possibly do. The delays in the transmission of books are most vexatious and destructive to progress. But unquestionably these are not chargeable to the Society, for every care is taken to despatch as quickly as practicable the successive fasciculi.

Of the several works noticed as still incomplete the past twelve months have seen the conclusion of some. The *Taittiriya Aranyaka*, on which Babu Rājendralāla Mitra has been engaged for the last seven or eight years has been completed, forming a volume in all of considerably more than 1000 pages! It is accompanied by a complete analysis of the work in English, and a valuable table of contents. The *Gopatha Brāhmana* has also been completed by the same editor after it had been in the hands of another scholar, whose death interrupted his labours. In this also, an introduction is given describing at length the nature, character, and contents of the work. Another work of high value completed during the year has been the *Pratiśākhya* of the Black Yajur Veda. For this, the preparation of an analysis in English was considered unnecessary, as Professor Whitney had already published a translation.

The *S'rauta Sūtra* of *Lāthyāna* has likewise been completed, and the learned Pundit who has edited it, gives promise of the *Tāndya Brāhmana* of the Sama Veda, which he has undertaken. It is hoped, with some confidence,

that, the Atharvana Upanishad, and the Pingala Chhanda Sūtra, will both be completed in the current year.

The fourth volume of the Sanhitā of the Black Yajur Veda, has also been completed, and the fifth is in hand. Of the eight books constituting the work, the three which now remain are short, and another volume will probably suffice to complete the whole. We are more disposed to feel gratified at having been able to advance this important work, so far as it has proceeded, under the difficulties attendant on its publication, than to be dissatisfied with the time occupied. The first book was edited by the late Dr. Roer, the second by Professor Cowell who then left this country, and the greater portion of the third by Pandit Ramanāryana Vidyāratna, and, on his death, it was taken up by the present editor, Professor Mahesachandra Nāyāratna.

It will not be necessary to vindicate the Society from charges of delay and neglect with regard to its Arabic and Persian issues which are acknowledged to be progressing with favourable speed, and to contain the most valuable historical works known to exist. And the principle on which the Society has acted of confining their publications to works bearing on India meets full approbation.

In connection with these subjects, I would myself as one not having the slightest pretension to such a knowledge of oriental languages as would justify my offering an opinion on the style in which these various works have been issued, express the gratification which I feel at finding scholars like Professor Weber, admitting fully the value of the series, and acknowledging the ability with which they have been conducted. But I would go further and venture to urge on those learned scholars who are so actively engaged in these pursuits, and who have been for years earnestly and actively endeavouring to make known to the world the rich stores of literary wealth which this country offers for utilization, whether the publication of translations into English accompanied by notes illustrating from other sources the text of their authors, would not gain for them a far wider and more numerous audience, and would not tend to advance very importantly the knowledge of their authors by bringing to their illustration the varied acquirements of others.

As an instance of how much knowledge can be brought to bear upon a single text, of what a flood of light can be thrown upon a single phrase even, I would ask any one to study Yale's marvellous edition of Marco Polo, which though not issued within the year under review may serve as an instance of what one would desire to see done, in a very minor degree, towards the illustration of some of the great national works the text of which is given in the Bibliotheca Indica. I am not sanguine enough to hope that many, if indeed any, may be found who could bring to their subject such a varied range of reading, so large and almost unlimited a stock of acquired, and still more

wonderfully systematized, facts, such quaint and curious illustration derived from the most unexpected sources, and yet most aptly and charmingly brought to use. Nor can it be, that many will be found capable of conveying all this information with such a charming simplicity of language or with such a force and power of description, that fragmentary as the whole is, one is unable to lay down the book when once commenced. But much would undoubtedly be gained, while more information than can be obtained elsewhere would be made accessible to all.

In connection with this subject, I am myself aware that for many years our able Secretary Mr Blochmann has been bringing together from every source opened up to him in the course of his extended study, a complete index to all geographical names mentioned in these oriental works. This 'Index Geographicus,' will be—if it ever see the light as we hope, and trust it will,—a glorious mine of knowledge charged with ore of the richest quality, and of the brightest and purest kind, and will really throw more light upon the changes, historical and political, dynastic and geographical, which have passed over this land, than any single collection that I can think of. Col. Yule has I rejoice to say undertaken to prepare for publication, and has far advanced in the work, a Manual of the Geography of India, which I have no doubt will contribute very largely to our acquaintance with the subject. He has indeed during the past year, given us a foretaste of the pleasure we are certain to derive from his labours, by a most masterly essay, introductory to the new edition of the travels of Captain Wood to the source of the Oxus. I would gladly dwell on this subject for a little. The district calls up every fanciful picture of Eden which may have joyed our childhood, and here we find all primeval tradition combining with all modern theory and knowledge, pointing out the cradle of our race, and the site of the Adamic Paradise, while its past history is interwoven with that of all the great Asiatic conquerors, and its coming history 'looms on the horizon rife with all the possibilities suggested by its position on the rapidly narrowing border-land between two great empires, one of them our own.'

• • But the wide range of the subject, and the value of Col. Yule's exhaustive interpretation of all available evidence bearing on it, would take up far more time than can now be spared. I would, however, commend this essay 'On the geography and history of the regions in the upper waters of the Oxus,' to every one who takes an interest in the early history of the country and of the many changes which have passed over it.

In connection with these publications of the Society and others, we may perhaps take a glance at some other publications bearing on the Archaeology of India. The Journal of the Society for the past year will be found rich in such information. We have descriptions of the antiquities of Baranpūr, Bindrabun, Gokul, Benares, Jaunpūr, Bengal and parts of Opissa. And

before all others, the masterly account of Bihar by Mr. Broadley, containing a mass of accurate description and information, the result of most zealously conducted researches and excavations. During the year also we have had the reports of General Cunningham, the Archæological Surveyor, detailing his researches during the seasons of 1862 to 1865 and affording a rich treasure of historical and other information regarding the districts visited, Behar, Gya, Tirhoot, &c., with a full discussion of the accounts of Fa Hian and Hwen Thsang. The second year was devoted to Delhi, Mathura, Kanauj, Allahabad, Ajudhya, &c. The third year's report takes up the Punjab and its ethnology and antiquities, while the fourth discusses the history of Jaipur, Ajmere, Gwalior, &c. A portion of these reports originally appeared in the Journal of this Society, but without the many and valuable illustrative plans and drawings which now accompany them. The work, in two goodly-sized volumes of more than 500 pages each, forms a convincing proof of the justice and wisdom of Lord Canning in first appointing General Cunningham to this task, and shews too what an almost exhaustless supply of valuable information bearing on the history, the architecture, the dynastic divisions and the geographical features of the country yet remains to be worked out. There is no question that many of the views put forth will be subject to modification and change as knowledge increases or more extended research is made. But this is the case in every such enquiry and in no way detracts from the value of these interesting reports.

Another work published, or at least received in India, during the year treats of another and very interesting part of the archæology of the country. The rites of sepulture, the curiously varied and complicated ceremonies observed by some people, and the simpler ritual which marks the proceedings of others give a special interest to all remains of the ruder monuments which in many countries mark the localities where the great dead have been interred, or their ashes entombed. Mr. Ferguson, to whom Indian archæology is so largely indebted, has given us a very full and satisfactory account of these rude stone monuments in all countries and among others in India. The portion of his work bearing on India, is by no means so full or satisfactory as other parts. But seriously deficient as it is, it gives an approximation to the state of knowledge on the subject, which will be of vast use. Indeed the real value of all such general treatises consists in this, that they indicate the boundary between the known and the unknown, and enable students to start from the advanced posts of existing knowledge without wasting time in preliminary investigation, or going over ground which had been fairly examined before; and in this point of view, such works as Ferguson's are of high value. But the very facility which they give ought to lead to early refutation or confirmation of their statements. Such sweeping assertions as that these rude stone monuments do not exist in the valley of the Ganges or any of its tribu-

taries, could be so readily disproved, (and indeed it has been) that there is no excuse for allowing it to remain before the world as a statement of facts. But I would hope for much more than this, and ask every one who has an opportunity of seeing such monuments to figure them and give a careful description of them, so that not only their mere existence, but all their peculiarities may be known.

Another work on Indian Ethnology and the habits and customs of the races inhabiting Bengal as the province is known now, which appeared during the year, is the splendid volume of Dalton's descriptive Ethnology. This was brought out at the cost of the Bengal Government, under the immediate supervision of the Council of this Society, and it is certainly one of the most admirably illustrated, as well as printed, books yet issued from Calcutta presses. But it has higher claims on attention than the mere get-up of the book. Col. Dalton has here given not only the information which he was able to obtain from others, but has told us in plain nervous language, and with a keen appreciation of humour throughout, his own experience with the wild tribes and peoples among whom his long service in India has almost exclusively been passed, and who have learned to know him so well, and knowing him to trust him so implicitly, that they who would flee in terror from other white faces come to him as an intimate friend and play with him as a loving child would with a revered parent. Indeed one of the great charms of the book is the insight you get into the true basis of these relationships of intercourse and friendship which have existed for years between the writer and 'his children.'

Descriptions ranging over such a wide circle of races could not be anticipated to be equally detailed or equally accurate in all. But if blemishes occur I hesitate not to say that those who read Col. Dalton's descriptions will rise from their perusal with enlarged information, and with matured sympathies. I would even suggest to the author whether he would not think of publishing a smaller and cheaper edition, taking advantage of any additional information which may have cropped up since, and using fewer illustrations thus rendering the work accessible to a much larger circle of readers. I must add that great credit is due to the Government of Bengal for the liberality with which it has enabled so nobly illustrated a volume in the ethnology of its provinces to be published.

In addition to the truly valuable series of descriptive papers on the antiquities and history of various places in India, we have in the Journal for the past year some curious coins illustrated, and notably a fine series of inscriptions of various dates, from some nearly five centuries old, down to last century and many throwing rich light on historical facts. It is hoped that this valuable series of the inscriptions may be continued, for General Cunningham has placed in our Secretary's hand, for decipherment and publication,

all his unequalled collection of these records. It may be noticed as a curious illustration of the value of such, even when apparently so placed that they must be tolerably known, that an inscription, which records a king in Bengal hitherto entirely unknown, was brought from the well known town of Kalnah on the Hooghly, where it must have been seen by thousands of visitors, none of whom ever thought of deciphering or taking a rubbing of the inscription ! A rich store of facts, both historical and chronological, will doubtless be opened up by the careful examination of such inscriptions, and in no one's hands could the task have been placed with higher prospects of success than in those of Mr. Blochmann.

Under the garb of a small School Manual published by the School Book Society, Mr. Blochmann has also given to the public one of the best and most complete Manuals of the Geography and geographical statistics of India, which has yet appeared. The information is derived from the most recent sources, and is not a mere reprint or compilation of the obsolete statements of Thornton and others, and in the small space of a little pocket volume, it contains an immense amount of condensed information bearing on the area, position, population, antiquities, history and general relations of all the divisions of the country.

If we turn our attention now to the division of our sciences represented by the second part of the Journal, I am justly able to congratulate the Society on a most fruitful and successful year. Dr. Day has continued his admirable Catalogue of the Indian Cyprinidæ, of which this year has given us three fasciculi. He has also described the fish collected in Kach'h by Dr. Stoliczka and discussed the relation of some of the genera of the Siluroid group.

The Mollusca of India have been illustrated by an excellent monograph of the Indian Clausiliæ by Mr. W. Blanford and Dr. Stoliczka. The land shells of Penang, and of Burma and Arrakan, have been well illustrated and described.

Dr. Dobson has continued his able and careful researches on the Bats of India and adjoining countries, describing several new and most important forms. I greatly wish we could hope to see from Dr. Dobson's accurate pen, a well illustrated monograph of Indian Bats. He must have already brought together nearly all the facts requisite for such a detailed catalogue, and the needful illustrations could readily be obtained in this country. I have no doubt that such a work would at once meet with all the support requisite to secure its success. There is a vast amount of information bearing on the Natural History of India already published, but published in such a scattered way, single papers here and there, in different journals and in different languages, that ordinary students, under the conditions of Indian life, have

no possible means of knowing what has been done, or what is already well known. Hence the supreme value of such monographs, compiled by those who have made a special study of the different groups and brought their knowledge up to date. No question such monographs would very rapidly require additions and call for alterations. Indeed this is the very result which would be sought by their publication, the bringing in new facts and exciting wider attention to the investigation. But this would not detract from their value, as statements of knowledge-acquired up to a certain date, and as affording a safe and carefully determined point of departure, from which future enquirers might start on their voyage of discovery.

The contributions of our able Secretary, Dr. Stoliczka, are valuable as usual. Besides his molluscan papers to which I have just alluded, we have a remarkably interesting and valuable paper on the Mammals and Birds inhabiting Kutch,—an admirable type of what the study of local faunæ is capable of yielding. He has also given some valuable notes on new or little known Lizards, and on Indian Batrachia; these papers on Kutch reptiles and Sind reptiles are sufficiently illustrated, and together constitute a range of additions to our knowledge of the Natural History of the country of the highest value and greatest scientific importance.

Ornithology has added to its store in the papers by Mr. Brookes on the Birds of Cashmir, and his brief notes on the Eagles, and Swans, &c. Mr. Hume has given a short critical notice of some Burmese birds; Major Godwin-Austen a third list of birds found in the Kasia and Garo hills, while Mr. W. Blanford has described and beautifully illustrated the birds of Sikkim. He has also given in the Journal the last part of a very interesting and charming account of his trip to the borders of Thibet in the Sikkim country, devoted entirely to the geological portion of his enquiries.

But while this summary will give sufficient evidence that the study of Natural History has lost none of its absorbing interest, and that the Asiatic Society of Bengal has fully and nobly maintained its grand traditional position as the repository of most of the advances made in these enquiries in this country, we can also congratulate you, gentlemen, that activity has been shown in other directions also, and outside our ranks. There is at last a fair prospect of the 'Flora Indica,' commenced many years since by Drs. Hooker and Thomson, being carried out under Dr. Hooker's guidance, and we are delighted to welcome it as a great, and at the same time necessary, contribution to our means of progress. The 'Flora Sylvatica' of Beddome also progresses soundly: the 'Conchologica Indica' of Hanley and Theobald, a work which, with all its very serious shortcomings, will be of great utility and value—still finds support and appears with regularity, while during the year we have had to welcome a new candidate for this support in an Indian magazine devoted to Ornithology. We could have wished that the author had completed the

several works which he had already commenced, rather than started a new publication. But we heartily welcome at the same time the issue of 'Stray Feathers.' It promises to be a useful catalogue of the Editor's very noble collection of Indian Birds, and a means of rapid publication of novelties or corrections, always of much value with ornithologists.

During the year also a very admirably illustrated work on the deadly Snakes of India has been issued at the cost of Government. The beautiful plates which are given with Dr. Fayrer's treatise on the 'Thanatophidia' must always command attention and recommend the work, while unfortunately they also add so very seriously to the cost of the book as entirely to preclude the chance of its ever getting into the hands of any but the wealthy. The work too does not pretend to be more than a practical statement of facts concerning these dangerous enemies to human existence in the country. It has no scientific novelties or discoveries to render it important as a work of reference in libraries, while as we have said it is locked up from the general public to whom it might be useful by the extreme cost. Could not all the information be given in a far more accessible form and at a very trifling cost?

Other matters of high interest have been brought before the public, though not immediately through the Society. One of the most important and probably fruitful discoveries of modern years in Physiology has appeared in the modest form of an appendix to the eighth report of the Sanitary Commissioner with the Government of India. This is the discovery by Dr. Lewis of a *Hæmatozoon*, inhabiting the human blood, and certainly accompanying, and in all probability causing, peculiar conditions of the secretions, frequently rapidly fatal and always exceedingly injurious to health. This is scarcely the place to discuss the details of such a discovery which, bringing into notice a diseased condition hitherto totally unknown, and in all probability opening the road to further discoveries regarding obscure diseases, especially affecting countries situated as we here are within the tropics, opens up an entirely new but most important enquiry.

The careful researches of Dr. Lewis associated with his able colleague Dr. Cunningham into the history and concomitant conditions of choleraic affections, must be well known to most of our members. And I have no hesitation in saying that the last contribution of these gentlemen published in the same report I have alluded to, adds largely to the mass of facts, bearing on this, to India, all important subject. The accuracy with which every appearance is sifted, and the evidence investigated, before it be admitted as a fact, and the fulness of the information sought and obtained, will render the entire series of these admirably conceived and executed microscopical enquiries, altogether essential to the study of this malignant

disease, the cause of which is still so obscure and unknown. And I would add also, will form a very excellent contrast to the carelessly arranged and hastily admitted, or even distorted, evidence, which has more than once been adduced in support of some favourite hypothesis as to the mode of propagation of this disease.

Dr. Lewis has also given the results of a careful investigation of the condition of cysted meat, such as is frequently to be met within the bazar. And perhaps it may comfort many, who may have been alarmed by ideas of disease to be communicated by eating such food, to know that he has conclusively shewn that such living organisms are entirely killed, if the meat containing them, be subjected for even five minutes to a temperature of no less than 145° Faht. Rarely indeed are human beings found so cannibal in their tastes, that their cooked food has not been subjected to this condition of temperature, and therefore rarely indeed can there be any fears of such diseased condition of the tissues being conveyed into our system. It is also a gratifying result of Dr. Lewis's enquiry, to notice the very rare occurrence of diseased meat of this kind, among the rations provided for our troops in this country.

Though special in their application I cannot avoid bringing to your notice the extremely valuable series of volumes, prepared by my friend and colleague in the Geological Survey, Dr. Stoliczka, descriptive of the cretaceous fossils of South India. These volumes form an invaluable record descriptive of one of the finest and most extensive collections from a single formation and a single district, which has ever been brought together, and have been prepared with a fulness of illustration and a widely embracing accuracy of description which render them essential to the Palaeontologist, and almost equally essential to the recent Conchologist. We desire to acknowledge the liberality with which the Government of the country has provided the funds necessary to enable us to double the quantity issued in the year of this series descriptive of Indian Fossils, and we rejoice the more in this, because we read it as a convincing testimony that the loving labours of my colleague, Stoliczka, are really appreciated. I who can speak from experience of his unfailing energy, of his untiring research and marked accuracy, and of his wide range of knowledge of all the bearings of his subject, know full well the immense labour which these works represent, the high scientific value of that labour, and the great interest which they have excited among the Palaeontologists of Europe. But more than all this I know too, and appreciate fully, the unswerving loyalty to his task, which the author has invariably shewn, and the undeviating conscientiousness and devotion which he has brought to bear on its accomplishment. Not only do we feel the high claims that Dr. Stoliczka has to rank among the very first of living modern Palaeontologists, but personally I would testify also to the claims

which he has established to be viewed as one of our very best friends and advisers, as well our ablest colleague. We have been making great efforts to complete the entire series of these cretaceous fossils which will form four very large volumes, convinced that they will be the very best proof of the ability of the author that can be submitted to the world of science at Vienna, as well as the noblest monument of his zeal and power.

As speaking of the labour of the Geological survey I may here notice that we have been rewarded during the past year by one of the most important discoveries which stratigraphical palæontology has made for several years. Dr. Waagen, whom ill-health has, I am sorry to say, driven to Europe again, has found true Ammonites in beds which from their other fossil contents will be unhesitatingly admitted as palæozoic. There may be some slight question as to the exact horizon in the carboniferous series which these beds hold, or whether they may not to some extent represent the border land between the carboniferous and permian, but *Athyris Roissayri*, *A. subtilita*, *Producta costata*, &c. are species which will be at once admitted as carboniferous and these are the associates of the Ammonites. I had taken advantage of Dr. Waagen's wide knowledge of fossils and of their distribution in establishing a careful research into the stratigraphical relationships of the curiously distorted, and faulted rocks of the Salt-Range in the Panjab, from which some very interesting fossils had already been described by Koninck, Davidson, &c. and it was while so engaged that he was rewarded by this most important discovery. It would be passing into discussions rather too technical perhaps to enter here upon any consideration of how far this discovery is consistent with views based on the developmental theories now generally admitted in the explanation of the several homologies in such series as those acknowledged in the Cephalopoda. It will suffice to state that the fact of the occurrence of a true Ammonite in unquestionably palæozoic rocks is one calculated to excite as much surprise as did the announcement many years since of the beautiful Ammonites (with Orthoceratites) found in the Triassic beds of Europe. The curious fossil, with some other of its associates, has been figured in the Memoirs of the Geological Survey of India.

Viewed therefore as a whole, the year 1872 has not been unfruitful in natural history progress and a fair general activity in such pursuits has marked our Indian labours.

Among the questions of cosmical interest which have excited the attention of the scientific world lately, none is of higher or wider importance than the transit of the Planet Venus across the disc of the sun, which is to take place in 1874. For five years past, the attention of astronomers has been earnestly directed to preparation for the observations required. And every Government and people, deserving to be called enlightened, has aided in these combined operations.

The last transit of Venus took place in 1769, more than a century since; and it needs but little consideration of the immense improvements which have been made in the accuracy of construction of astronomical instruments, in the preparation of telescopes, and above all in the marvellously beautiful application of photography in self-recording instruments for such transient phenomena, to see that there is not only a well founded hope, but a certainty, that the determination of the elements of the vast calculations to be based on the phenomena will be far more careful and more accurate than before. Fortunately also, another transit will recur within a short interval or in 1882, and with the experience gained in 1874 and the extension of points of observation contemplated for 1882, we may I think confidently look forward to seeing that all-important determination of the distance of the earth from the sun established with extreme accuracy. On this, as is well known, depend all the dimensions of the solar system. The British Government have undertaken the provision of instruments and observers for five stations. These are selected with a special view to their value, as enabling the best observations to be carried on. These five stations are, Oahu in the Sandwich Isles, Kerguelen Island in the Indian Ocean, Rodriguez a dependency of Mauritius, Auckland in New Zealand and Alexandria. Of the three first in the list, the longitude is to be determined accurately by a whole year's series of observations. Further, owing to the distance, the parties of observers must leave England more than six months before the time of transit. Instruments alone will cost considerably more than £10,000, conveyance, pay, sustenance as much more. This may seem a large sum, but as compared with the object in view, it is as nothing. The acquisition of knowledge of so much importance to all civilized nations, and the seizing on an opportunity of rare occurrence for fixing some of the most important astronomical and cosmical questions alone would have justified, nay would have demanded, the outlay of almost any sum. And I have no reason to doubt, that the answer to the suggestion to carry out this most important observation in a fitting manner from the head of the Treasury in Great Britain would have been precisely the same, 'they have no objection to offer to the expenditure, were the sum required ten times what it is.'

In addition to the stations thus specially selected, the observatories of Melbourne, and Sydney, of the Cape of Good Hope, Madras and Bombay, will all be utilized. The whole sea board of the United States of America, and the Canadian localities will all be favourably situated for certain observations and we may safely trust that the well known energy and zeal of our American brethren will not fail them here. To supplement the observations in the southern Hemisphere, by others in the northern, we must look to the Russians who have in their widely spread territories many localities admirably adapted for such observations. For one special class of observations

indeed, observations of the egress of the planet as retarded by parallax, these localities will be essential. But the well known skill of the Russian astronomers leads to the most implicit confidence that no portion of the required observations will be omitted in their hands. Such, gentlemen, are a few of the preparations which have been in progress for the observation of this rare phenomenon. And I am happy in now being able to announce to you that the Government of India have, on representations made to them of the value of a series of observations especially photographic in the clearer atmosphere of some high elevation in North India, at once sanctioned the necessary expenditure for instruments, and have telegraphed for their immediate preparation.

In connection with this, the General Committee of the British Association at their meeting in 1872, August last, requested the Council to take such steps as seemed desirable to urge the Indian Government to prepare these instruments, with the view of assisting in the Transit of Venus in 1874. And they added,—and to this I would ask your special attention—“and for the continuation of solar observations in India.”

It may perhaps appear to some that we have quite enough experience of solar effects in this country without establishing an observatory for the special study of such facts. The intimate connection of what we speak of as the weather with changes on the solar surface, the remarkable statements lately put forth apparently with good ground, that the cyclones of the Indian Ocean and its more southerly extensions are also connected with these changes, and the bold assertion of a belief, by Mr. Maury, whose opportunities for observation have been unequalled, that he is fully convinced that changes in the seasons can be foretold with the aid of a properly conducted and sufficiently wide system of observations, all these facts tend to show the vast interests involved and the high importance which naturally attaches to such observations. And we cannot but express an ardent hope, that it may commend itself to the Government of this country to maintain and render permanent the small establishment about to be fixed on some elevated spot for the observation of the transit of Venus, and so form one observatory to be maintained for a special object and with a view to a continuous and sustained system of observations of those peculiar phenomena.

Col. Tennant, in submitting a brief statement of the advantages of such an observatory, has very justly insisted earnestly on the vast importance of determining beforehand the nature of the work to be done, and of carefully adhering to this system when once established. He pointedly refers to the glorious result of such a rigid adhesion to one object of work in the observatory of Greenwich, established with a special view to perfecting the art of navigation. Since the days of Charles the Second, the efforts of the astronomers of Greenwich have been without cessation devoted to building up what

Le Verrier has called that 'prodigious series of observations,' which may be taken as the fundamental bases of the theory of the moon. For now all but two hundred years have their efforts been devoted to increase and to preserve these glorious records. And the practically beneficent result to all civilized nations, and more especially to those much interested in navigation, have been almost incalculable.

I notice this point more prominently because I am thoroughly satisfied from experience now of many years in this country, that one of the great causes of the comparative failure of many well devised and for a time well carried out schemes of enquiry and observation has been this want of a maintenance of an established system fully thought out in the first instance and modified only so far as to improve and extend, without material alteration. This is unfortunately true of almost every department in this country. The agency is constantly changing and each successive occupant of a post thinks it incumbent on him to signalize his reign by some change, all the better if marked and defined. Another may succeed, and a certain amount of reversion to old systems be again introduced. But meanwhile half the value of the accumulated knowledge is gone, because it is not as it were referable to the same standard. This curious absence of any want of faith in the traditional systems of operation which is to a large extent due to the rapid changes in the controlling elements in this country, and to the absence of those permanent officers, which in England are the mainspring of the machinery, and maintain the works in steady operation, men who in the great offices at home are in reality those who keep the Government of the country going, forms a remarkable contrast to the perfection with which the mere paper records of former Governments are kept, records which however are with exceeding rarity, if ever, examined by new incumbents, until some difficult question be raised.

But if a well designed system be once established with reference to such solar observations, and such studies of the motions of the satellites as Col. Tennant proposes, there can be very little doubt, that most valuable results will arise from a sustained systematic observation, which could never be expected from desultory action and interrupted system.

And looking to the immense gain which would result from such an observatory being at considerable elevation, above the mist and clouds which encumber the lower strata of the atmosphere in these countries there can be but little doubt that those results will be clearer and less obscure than could be the case at any lower elevation.

It is hoped that the establishment of such an observatory might be made the means of instruction to many in practical astronomy, means at present entirely wanting in this country. That the people of this land can investigate such subjects with much success is well shown by the care and

accuracy with which eclipses are calculated, while the visitor to Delhi or Benares will not have failed to be struck and deeply struck with the noble remains of the observatories of old, and will have dwelt with grief on the decay of knowledge since the days when such wondrous erections were not considered too costly or extensive for astronomical observations. Indeed it would seem that the maintenance of such observatories is one of those things which commend themselves to the wealthier natives of this land. And if trained observers, accustomed to work with the improved instruments of modern days, were available, I think we would be justified in anticipating that in many places such would be utilized; and their results, guided into proper channels by advice and system, would prove most valuable adjuncts to any general system of investigation. It is certain, that the establishment of such an observatory does hold out hopes of a successful teaching of astronomy which have long been sought, but have never existed in this country.

Another noble undertaking on the part of the British Government, in which Indian naturalists and geographers are deeply interested, is the expedition of H. M. S. 'Challenger' for a three or four years' cruise, with a view to the investigation, by dredgings and other means, of the physical history of the bottom of the sea, its currents, its temperature, its depth. Looking to the wonderful results obtained by a similar expedition under the guidance of the veteran Agassiz round the south coast of America we are justified in anticipating for the well organized and fully equipped expedition of the Challenger results of the very highest importance to Natural History, to geology, and to physics. And we doubt not that these hopes will be fully verified. But we, in India, are especially interested in this expedition, inasmuch as we are, as it appears to me, bound to make every effort to supplement the researches of the Challenger, by similar investigations within our own waters. The Indian seas are not included, indeed have been excluded from the route adopted for the Challenger, and unless Indian naturalists can obtain the required information in other ways, there is no hope of obtaining it at all. A Committee of our Society has been organized for the purpose, as you are already aware; the necessary funds for the purchase of instruments have been granted, and these instruments are in progress; and it now only wants that a ship suited for the purpose may be placed at the disposal of the Committee, so that the work may be carried out. The ground to be examined is almost a virgin soil. There have not, that I am aware of, ever been any dredgings worth notice round our shores; and even the recent littoral conchology of the Indian seas is very slightly known. An immense area of country is now formed of rocks of comparatively very recent formation round the coast of India, and it is simply impossible that the study of their rich molluscan fauna can ever be carried out effectively until the recent and lying molluscs of the existing ocean are better known. .

It may probably interest some who have not followed out the preparation for these researches to mention briefly what has been done. The 'Challenger' is a steam ship of nearly 1,500 tons burden. Her warlike armaments are removed as she is going essentially on a mission of peace. She carries no less than 600 gallons of alcohol, and 120,000 fathoms of line for soundings, with an ample supply of tubes and cups and vessels, all specially designed for bringing up the sand, mud, shells, &c. from the bottom of the ocean. A whole armoury of thermometers and other instruments, dredges, harpoons, cages for animals, Wardian cases for plants, &c., &c., accompany. In addition to the officers who have all been selected for their special acquirements and who will carry on a complete series of magnetic observations, there is Dr. Thomson who is at the head of the scientific part of the expedition; Mr. Moseley and Dr. Von Seebein as naturalists; Mr. Buchanan as chemist; Mr. Wild, as artist, and a skilled photographer from the Royal Engineers. The route is to be to Gibraltar and Madeira, thence across the Atlantic to Bermuda, east again to the Azores and Canaries; west to Brazil, Trinidad, and then to the Cape of Good Hope. Thence she will proceed to Kerguelen Island, then to the Antarctic ice regions, to Australia, New Zealand: then she will visit the Coral Islands, New Guinea, Torres Straits, Manilla and Japan. From Japan to Vancouver's Island and thence to Valparaiso, the Magellan Straits, Rio Janeiro, and England, where she is expected to arrive in 1876.

Surely if such an undertaking can be accomplished in England, the great Government of India can carry out the comparatively petty labours which would be the lot of naturalists working up and down in Indian waters.

Great pressure of other work, and I regret to say impaired health, have prevented my doing more than give you a very brief notice of some of the labours which have engaged the attention of the scientific world in India during the past year. I must ask your indulgence for its many shortcomings, and now conclude by thanking you very heartily for the kindly and ready support I have during the year invariably received from the members of the Society, and by wishing that the coming season may find the Society more prosperous and more successful. Experience of the past leaves no doubt as to the activity of its supporters in their various lines of research. We have only to trust that the needful funds may be available to enable their researches to be brought properly before the public.

The Meeting then resolved itself into an ordinary Monthly Meeting.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced.

From the author, a copy of a Report on the Bladder Worms found in Beef and Pork, by T. R. Lewis, M. B.

On a Hæmatozoon inhabiting Human Blood, by T. R. Lewis, M. B.

A Report of Microscopical and Physiological researches into the nature of the Agents producing Cholera, by T. R. Lewis, M. B. and D. D. Cunningham, M. B.

2. From the Chief Signal Officer. Washington, U. S., Three weather charts.

3. From the author, a copy of a work entitled Sherpur Bivarana or an account of the Sherpur Pargana, District Mymensing, in Bengali, Part I. Descriptive Geography, by Harachandra Chaudhuri.

4. From the Royal Society of Tasmania, copy of results of 5 years Meteorological Observations for Hobart Town and of Practical Hints to Emigrants intending to proceed to Tasmania with a full description of the several countries and their products, and a paper on local industries by E. C. Nowell, Esq.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members.

R. R. Bayne, Esq.

T. R. Lewis, Esq., M. B.

The following are candidates for ballot at the next meeting.

A. Cappel, Esq., proposed by T. Oldham, Esq., LL. D., seconded by L. Schwendler, Esq.

A. J. Hughes, Esq., C. E., proposed by J. Wood-Mason, Esq., seconded by G. Nevill, Esq.

G. W. Barclay, Esq., proposed by H. Blochmann, Esq., M. A., seconded by W. L. Heeley, Esq., C. S.

Babu Satyadaya Banerji, B. L., zemindar, proposed by Babu Rájendra-lála Mitra, seconded by H. Blochmann, Esq., M. A.

The following gentlemen have intimated their desire to withdraw from the Society.

J. H. Newman, Esq., M. D.

J. C. Geddes, Esq., C. S., Puri.

The election of Col. H. Drummond, R. E., is cancelled at his own request.

Letters were read—

1. From the Assistant Secretary to the Government of Bengal, forwarded.

ing copies of the following correspondence on the earthquake felt at Kámrúp on the 19th December last.

No. 2688T, dated Sibságar, the 30th December, 1872.

From—COLONEL H. HOPKINSON, *Governor-General's Agent, North-East Frontier, and Commissioner of Assam.*

To—*The Officiating Secretary to the Government of Bengal, General Department.*

I have the honor to submit, for the information of Government, an extract from Major Lamb's diary of the 19th December, 1872, regarding an earthquake which occurred in the Kámrúp district on that date. I have not heard of the earthquake from any other district, but it appears to have been felt here (Sibságar) slightly, though I myself did not notice it.

Extract from the diary of MAJOR LAMB, Deputy Commissioner, Kámrúp.

Thursday, 19th December.—"On my way back to camp, just as I was emerging from the sál forest,* I heard a sound, which at first I took to be caused by the beating of a large number of dholes or tom-toms, in a village about a mile or more in front of me, a little to the west of north, but after listening for a couple of seconds the sound was evidently progressing rapidly southward, and towards the direction of my camp, which was a mile to the west of where I was at the time, and gradually changed into what one might imagine a strong current of electricity would produce in passing through the earth from pole to pole southwards, shaking and rattling rocks and dispersing fragments in its progress just below the surface of the ground, the huge boulders being hurled down some rocky incline and shaking the very foundations of the earth at each rebound, until at last the sounds became more indistinct and resembled the sound of heavily laden waggons, going with considerable rapidity over a rough hewn rocky road; and passed off like distant thunder. There was no more possibility of mistaking the direction the sound came from and went in, than there would have been if I had heard only guns fired in two distant places, for each report was distinct, and as the sound passed along, it disturbed first some people in the direction of the village I alluded to, and they set up a shout, next a flock of paddy birds was scared and rose *en masse*, and still further south and west a herd of cows grazing, suddenly ran together and faced the jungle to the north for a few seconds, and then all turned round and commenced a regular stampede till brought up by a bheel. My turn came next, I was in my howdah and had a pad elephant with me, on which sat a forest ranger who went to show me the teak plantation and reserve. The animals put up their trunks and stood still for a few moments, but hearing the subterranean sounds approaching, both turned and evinced an unmistakable desire to

* In mousah Pantan.

seek refuge in the forest which was within a hundred yards of us. The mahout on my elephant, by pressing the point of a bit of bamboo he had to drive the animal with against its forehead, persuaded him to believe that there was more to fear from the front than the rear, and so the animal stood grumbling till the tremulous motion of the earth subsided and the rumbling ceased. I saw the pad elephant just disappearing into the forest with his riders, and sent men after them to pick the unfortunates up, if they chanced to have been thrown off, and waited some time, but as they did not appear, I continued my course back to camp, and had the satisfaction of seeing the runaway bringing his riders along at full speed in the same direction when I was near my tent. Being on an elephant, I did not feel the motion of the ground nor did I perceive the trees move or the earth undulate, but the villagers I spoke to, seemed to think it was more severe the further I proceeded; and I noticed fissures in the moist sand of the river all in the same direction (east and west) athwart the course of the earthquake. I was met by a number of natives on my arrival, and they informed me that it was here almost as severe an earthquake as that which occurred in 1869, and that the first smart shock had been followed by two slight ones at short intervals. I must have been just within the left or southern margin of the course the current passed along. To-morrow I hope to be able to ascertain how far northward the shock was felt."

2. From the Secretary to the Government of India, Home Department, (Public) forwarding a set of 24 photographs taken by Major R. Gill, of the temples in the Buldana and Bassein districts in west Berar.

The following extracts from Major Gill's notes accompanying the photographs are of interest.

Extracts from notes on Hemadpauti Temples &c., made during a tour through a portion of West Berar in 1868, 1869 and in May, 1871 by Major GILL.

JAIPUR KOTLI.

At Jaipur Kotli, 14 miles north of Buldana, are two old temples; the finest is in the centre of the village, and the smaller one outside at a short distance to the south-east. The general plan of the larger temple is in the form of a cross, with the larger arm to the west, and the entrance to the east. The portico which formed the east end, however, has now almost entirely fallen away. The south wing contains two small recesses, the outer one open at the top; the corresponding one in the north wing is only an enclosed recess containing a linga and yoni. The centre of the temple is fifteen feet two inches by fifteen feet one inch. In the centre of this the floor is slightly raised, forming a sort of square dais, at the corners of which are four columns eight feet eight inches in height, of the same style as those at

Vide photographs 26 and 27. the entrance, and supporting an architrave of one foot three inches deep, over which is a frieze one foot in height. This is ornamented with geometrical patterns on both faces, and with rosettes in the centres of the under sides. From the frieze rises the usual Hemadpauti dome ornamented with chaste shell pattern sculptures.

This temple is quite in the Jaina style of architecture of the early part of the 13th century.

ĀMDAPŪR.

Āmdapūr is 20 miles east of Buldana, and about half a mile to the south of the village is a small hill bordered on the south and south-east by a deep picturesque ravine, and falling out into the plain by gentle undulations to the north and west. On the summit of this hill stands a fine modern temple dedicated to Bhowani, of whom there is an image bedaubed with red lead in the sanctuary which is curiously lit from above in such a way as to throw the full light upon the image, while the spectator sees it only through a chink in the door, and, the mandar being nearly dark, the effect may be somewhat startling to the ignorant.

Near this temple are seen some fragments of a large colossal statue.

Vide photograph 31. These are a pair of feet six and a half feet from toe to heel, and a hand to match, so that the statue may have been from fifty to sixty feet high. This enormous figure has not been a monolith, but built up in pieces, as is evident from the heel being separate from the fore part of the foot which includes the ankles. Over the foot there is an anklet but there is no indication of the toe-joints or of the extensor muscles over them, while the ankles are on a level with one another. Near them is another pair of feet somewhat smaller. The villagers say that a fine Hemadpauti temple formerly stood on the site of the present Hindu one; and this seems to be confirmed by the fragments built with it, and lying about in all directions.

SIRPŪR.

Sirpūr is 56 miles east of Buldana, and a short distance to the west of it is the temple: It is entered by porticoes on the north, south, and east sides. The doors are five feet four inches high, and two feet nine inches wide, and the porticoes are ten feet wide by nine feet six inches deep. These have been supported by two pillars in front and two pilasters, one on each side the door, corresponding with those inside. In the north portico a third

Vide photograph 35. pillar has been subsequently introduced to support the cross beam in front which had given way. In the centre of the temple are four columns nine and half feet and two feet three inches square at the base, forming a square ten feet nine inches on each side, in the middle of which is a low circular dais seven feet eleven inches in diameter. In

Vide photographs 33, 34, and 35. line with these pillars are pilasters on each wall, and in the corners are half pilasters,

MAHKAR.

Mahkar is nearly 28 miles west of Sirpúr. The temple is on the low spur of a hill, projecting from the lower or

Vide photographs 1st Series, 6, 7, 8, and 9: 2nd Series, 37 and 38.

west side of the town, and nearly almost to the level of the Pen Ganga River; it consists of a square court 21 feet 10 inches on each side, descended to by two steps on each face, and is surrounded by a triple colonnade, consisting of 60 pillars in all, with 32 pilasters against the outer wall, one opposite to each row of columns. The entrance is by a small door in the east face. Including the colonnades the length is 73 feet 4 inches, and the breadth 72 feet 9½ inches. The columns in their general style resemble those in most of the oldest temples all over British India, and are almost copies of those that still remain of the very oldest of the Jaina temples in Guzerat. The base and lower third or two-fifths of the shaft is square; on each side there rises from the plinth to the level of the upper side of the base a triangular facet, and this ornament is repeated in front of the double cincture and fillets that terminate the square portion of the shaft. The next member is a deep octangular band carved with leaves above which the pillar may be regarded as circular, rusticated by a square block and a thin octangular fillet carved with geometrical patterns. Above the block the shaft is cut into scotias and toruses interrupted by triangular facets on four sides. The capitals are thin with a narrow square fascine over a circular fillet and cyma recta, separated from the shaft by a torus. The capital is surmounted by a sur-capital of the quadruple-bracket sort so common in the Jaina temples at Gírnár and elsewhere. The style and construction of the roof also is identical with the oldest Guzerat temples, and was doubtless connected historically with the style of the same western buildings through the Chalukya dynasty of Devagiri, now Dowlatabad. The columns are nearly equidistant, varying from six feet five inches to seven feet one inch; they do not exceed eight feet in height, and are so arranged that every four form a square of nearly one, and from capital to capital large slabs of stones are laid to support the roof. From centre to centre of these others are placed covering in the corners, and leaving a small square in the centre, the corners of which are again enclosed as before, leaving a still smaller square which is shut in by one large slab usually ornamented by a rosette in centre. Over this three or four feet of debris complete the roof.

In this building no cement of any kind has been used, as indeed lime was never employed by the Hindus before the Mahomedan invasion; the stones are cut so as exactly to fit one upon another.

LONÁR.

At Lonár, nearly 12 miles south of Mahkur, there are several Hemadpanti temples and tanks, also a Hindu temple which has evidently been

originally a Hemadpauti, if no Budhist's structure. Below this temple

Vide photograph 24, 1st Series. is a tank with flights of steps and terraces

leading down to it. The water flows through the sculptured kind* of a bullock, and is fabled to come under ground all the way from the Ganges. People of all castes, men, women and children bathe promiscuously in it. The water is constantly removed as it passes through one aperture at the bottom as fast as it flows in. Below the Hindu

Vide photograph 25, 1st Series. temple is the salt lake leading down to which there has been a magnificent flight of steps,

a large portion of which still remains.

Regarding this salt lake there is a wonderful legend of a giant named Lonásur who lived in a subterraneous abode, made by himself under a hill about a mile from the place where the village of Lonár now stands. When this monster had destroyed many human beings and animals, and threatened to overthrow even the gods, the latter became alarmed and supplicated Vishnu to relieve them from the danger. Vishnu assumed the form of a beautiful youth to gain over the assistance of the giant's two sisters. By their assistance he discovered the subterraneous dwelling, and with a touch of his toe he threw off the covering of the den and found the giant asleep. Engaging in single combat with him Vishnu slew him, and buried him in the very pit he had made his home: this was the present salt lake of Lonár. Its water is supposed to be his blood, and the salt is his decomposed flesh. A hill standing, according to the Berar Gazetteer, 36 miles to the south-west of Lonár, but according to my informant only about a koss from it, is said to be the lid of the den thrown off by Vishnu, and is reported to coincide in shape and size with the surface of the lake.

The lake is about a mile across, or three miles round, and is supposed to be the crater of an ancient volcano. *Vide photograph No. 24, 1st Series.* Round the top of the basin is about five miles, and the sides slope abruptly down, and are covered with jungle and trees. Immediately round the lake are dense rings of tamarind, date, and babul trees, in which panthers, bears, and wild hog are frequently found, and in which pea-fowl generally abound. Nearly in the centre of the lake are two deep fissures hitherto unfathomed, through which impregnation takes place during the monsoon, when only pure crystals of salt (Dalla) are obtained from their edges by divers. But to enter these openings during the hot season would be certain death. Evaporation takes place to a very considerable extent during the hot season, and leaves a crystallized deposit (Papri) upon the surface that gives the lake the appearance of being frozen over. This deposit is carefully collected, as well as the earth (Bhuski) beneath it, which is also to a certain extent impregnated. These deposits are very valuable, and yield a

* Head ?—En.

handsome revenue to Government. Dalla is sold at Rupees 85 per kandi; papri at Rupees 18 to Rupees 25; and bhuski Rupees 8 to 10. The rent at présent is Rupees 6,500 per annum on a three years' lease.

The finest temple is outside the village to the south within a mudwall. When I first visited it, more than twenty years ago, the whole basement was buried in debris, but the sculptures were far more perfect than they are now. The basement has been unearthed, and the temple otherwise thrown open, and now the first sight of it takes one by surprise.

Like those of Amruth and Somnath the whole exterior of this temple is one mass of sculpture, and the eaves and some of the borders are very beautiful; but though the quantity of sculpture is so great, the subjects are comparatively few,—gods of the Hindu pantheon, obscenity in its grossest forms, dancing girls and musicians, and all the paraphernalia of debauchery. Many of the groups visible twenty years ago have since been knocked off, a piece of Vandalism similar to that acted at Ellora where several statues were emasculated to save the blushes forsooth of two prudish ladies: but still traces remain to render it a case of "*honi soit qui mal y pense*."

The next Hemadpauti temple is to the north of the village, and midway

Vide photographs 1st Series,
Nos. 13, 14, 15, and 16.

between it and the temple and tank; it consists of a portico with small wings at each end open in front, but enclosed on the other side and supported by three lines of columns and pilasters opposite each column in the third rank. It measures 102 feet by 20 feet, and there has been an enclosed building in a line with one of the wings. It is supposed to have been a place of almsgiving; the recipients occupy the portico while the victuals were cooked in the enclosure.

To the east of the large temple is a fine Hemadpauti tank.

Half way along the road to the salt lake is another very pretty temple, and there are four others in the margin of the lake, the three best of which are pictured in the photographs.

Vide photographs 1st Series,
Nos. 21, 22, and 28.

All these temples probably belong to about the 12th century when the Hindus seem to have been perfectly "mad upon their idols" and were only saved from utter degradation resulting therefrom by the inroads of the iconoclastic followers of Islam.

DHOTRÁ.

Dhotrá is about 80 miles north by west from Lonár, and about half a mile south-east of the village stands a very fine temple, and near it are the remains of a splendid tank, which if cleared out would yield a plentiful supply of good water throughout the year to the poor villagers who have to go

nearly a mile to secure only a scanty supply of water. The mere ruin of a second lies to the west, and a third, much smaller but perfect to the north-west, on the outskirts of the village.

SĀTGĀM.

At Sātgam, 24 miles west of Dhotrá, there are five Hemadpauti temples.

The principal one is just outside the west wall of the village, and almost adjoining it. *Vide* photographs Nos. 2, 3 & 4, 1st Series; and 43, 49, 2nd Series.

Vide photograph No. 46.

On the north side are the remains of a small but beautiful temple which appears to have been originally in the same enclosure. The other three are closely within the village walls; the largest of them is merely an oblong apartment containing the Linga and Yoni and an image of Ganesh. There has been a verandah in front supported by four columns; and the entrance has been elaborately sculptured. In the centre of this verandah is a large sculpture of Nandi. The next in size consists of four columns supporting the architraves, above which is the common simple roof. But the backs of the posterior pair of columns being only rough hewn, this may have only been the portico of another temple.

The fifth is only a small cell distinguishable as Hemadpauti only by the pilasters on each side of the entrance.

NOTES.

These temples are supposed by the natives to have been raised by demons in a single night, but from the title they generally bear they are ascribed to Hemad Kant or Hemadi Paut, who was prime minister to Ram Chandra Deva or Ram Deva Yado, the last of the Devagiri rajahs, of whom two copper-plate grants, dated respectively A. D. 1273 and A. D. 1291, have been published by Mr. Watham. He was also minister in the reign of Madhao, the predecessor of Ram Deva and in possession of all the regal powers. Mr. Walter Elliot dates the ascensions of Madhao in A. D. 1261, of Ram Chandra in A. D. 1272, and of Shunkur Deva in A. D. 1311.

All these temples, as already remarked, are erected without any cement of any kind. The different pieces are fitted together with the greatest accuracy and partially secured by tenons and mortices left on and cut into the blocks. They have been built with distinct inner and outer facings much like modern Public Works Department works, only the stones were not splayed back; and so the work was more likely to be durable. The interior of the wall was then filled up with rubbish,—the perfection of the beds of the stones is evidenced by the length of time they have stood,

The style of lighting is wonderfully adapted to the character of the works and architectural features, all lights being raking strike only the edges of the endless angles, and the result is a subdued brilliancy which is exceedingly pleasing.

The natives say that beneath the lingas in these are buried heaps of treasures.

The receipt of the following communications was announced.

1. Note on two coins from Kausámbhi by the Hon'ble E. C. Bayley C. S. I.
2. History of Pegu by Major General Sir A. P. Phayre, C. B., K. C., S. I.

LIBRARY.

The following additions have been made to the Library since the last meeting.

Presentations.

*** Names of Donors in Capitals.

Memoirs, Part II, Vol. XXXIX,

- A. Savitsch.—Les variations de la Pesanteur dans les Provinces Occidentales de l'Empire Russe. Prof. Cayley.—On the Geodesic Lines on an Ellipsoid,—The second part of a Memoir on the Development of the Disturbing Function in the Lunar and Planetary Theories J. W. L. Glaisher.—On the Law of Facility of Errors of Observations, and on the Method of Least Squares.

THE ROYAL ASTRONOMICAL SOCIETY.

Monatsbericht, August, 1872.

- Braun.—Nachträgliche Mittheilungen über die Gattungen *Marsilia* und *Pilularia* Peters.—Über eine Sammlung von Batrachiern aus Neu-Freiburg in Brasilien.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Bulletin, Octobre, 1872.

- E. Masqueray.—Le Gulf Stream.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Schriften, 1869—72, Jahrgang 10—13, Abtheilung 1te.

- Prof. E. G. Zaddach.—Beobachtungen über des Vorkommen des Bernsteins und die Ausdehnung des Tertiargebirges in Westpreussen und Pommern. J. Schumann.—Preussische Diatomeen. Dr. A. Hensche.—Der Gräberfund bei Fürstenwalde. Dr. G. Berendt.—Ein geologischer Ausflug in die Russischen Nachbar-Gouvernements, Rob. Caspary.—Anhang, Pinus Abies, L. Arnold Ohlert.—Zusammenstellung der Lichenen der Provinz Preussen. O. G. A. Brischke.—Die Hymenopteren der Provinz Preussen. A. Müller.—Ueber drei in der Provinz Preussen ausgegrabene Bärenskädel. Paul Schiefferdecker.—Der Begräbnisplatz bei Stangenwalde. Dr. H. v. Sickingen.—Beschreibung der in Preussen gefundenen Arten und Varietäten der Gattung *Sphagnum*. Ernst Dorn.—Die Stationen zur Messung von Erdtemperaturen an Königsberg.

THE ROYAL PHYSICO-ECONOMICAL SOCIETY OF KÖNIGSBERG.

La Langue et la Littérature Hindoustanie, en 1872 : Rhétorique et Prosodie des Langues de L'Orient Musulman, par M. Garcin de Tassy.

THE AUTHOR.

A Report on the Bladderworms found in Beef and Pork, by T. R. Lewis, M. B. :—*A Report of Microscopical and Physiological Researches into the Nature of the Agent or Agents producing Cholera*, by T. R. Lewis, M. B. and D. D. Cunningham, M. B. :—*On a Hæmatozoon inhabiting Human Blood : its relation to Chyluria and other diseases*, by T. R. Lewis, M. B.

THE AUTHORS.

Sherepur Bivarana, part I, Geography, by Harachandra Chaudhuri.

THE AUTHOR.

The Rajahs of Rajshahye, by Kisory Chand Mittra.

THE AUTHOR.

Results of Five Years' Meteorological Observations for Hobart Town, by F. Abbott ; *Practical Hints to Emigrants to Tasmania*.

THE ROYAL SOCIETY OF TASMANIA.

War Department Weather Charts.

THE CHIEF SIGNAL OFFICER OF WASHINGTON, U. S.

The Christian Spectator, Vol. II, Nos. 19, 20.

THE EDITOR.

Ramáyana, Vol. III, part 4. Edited by Hemchandra.

THE EDITOR.

Memoirs of the Geological Survey of India, Palæontologia Indica, Vol. IV. 2.

Dr F. Stoliczka.—*Cretaceous Ciliopoda of Southern India*.

THE SUPT. OF THE GEOLOGICAL SURVEY OF INDIA.

Report on the Administration of Bengal, 1871-72.

THE GOVERNMENT OF BENGAL.

Exchange.

The Athenæum, Oct. and Nov., 1872.

Nature, Nos. 166—168.

Purchase.

Revue des Deux Mondes, 15 Nov., 1 Dec., 15 Dec., 1872.

Comptes Rendus, No. 19, 1872.

M. Th. du Moncel.—Note sur les Courants accidentels qui naissent au sein des lignes télégraphiques dont un bout reste isolé dans l'air. *M. Grace-Calvert*.—Sur le pouvoir que possèdent plusieurs substances d'arrêter la putréfaction et le développement de la vie protoplasmique. *M. A. Doran*.—Sur les propriétés fébrifuges et antipériodiques des feuilles du Laurier d' Apollon. *M. E. Ferrière*.—Sur les causes de fièvres intermittentes et les moyens de les combattre. *M. Pigeot*.—Sur les propriétés antifermentescibles du silicate de soude. *M. Carbonnier*.—Sur la reproduction et le développement du poisson télescope, originaire de la Chine.

• No. 20, 1872.

M. Becquerel.—Mémoire sur l'origine solaire de l'électricité atmosphérique. *M. Dufosse*.—Études sur les types ostéologiques des Poissons osseux.

No. 21, 1872.

M. Tresca.—Note sur la forme qu'il convient de donner aux mètres que la Commission internationale doit construire. *M. Bouillaud*.—Sur la théorie de la production de la chaleur animale. *M. Jaannel*.—Recherches sur la production naturelle des azotates et des azotites. Application de l'engrais minéral à l'horticulture. *M. E. Bertin*.—Étude sur la ventilation d'un transport écurie. *M. Léon Vaillant*.—Sur la distribution Géographique des *Percina*. *M. F. Tisserand*.—Sur la planète (116) *Sirona*. *M. J. Bouryet*.—Théorie mathématique des expériences acoustiques de Kundt. *M. Cazin*.—Sur l'énergie magnétique. *M. L. Cailletet*.—Recherches sur l'acide carbonique liquide.

Nos. 22, 23, 1872.

M. Th. du Moncel.—Sur les courants accidentels qui naissent au sein des lignes télégraphiques dont un bout reste isolé dans l'air. *MM. A. Rabuteau et F. Papillon*.—Des effets thérapeutiques du silicate de soude. *M. L. Vaillant*.—Sur la valeur de certains caractères employés dans la classification des Poissons.

Journal des Savants, Novr. 1872.

M. J. Bertrand.—Théorie mathématique de l'électricité. *M. Dulaurier*.—Historiens anciens et modernes de l'Arménie.

Revue Archéologique, XI, 1872.

• *M. V. Guérin*.—Découverte du Tombeau des Maonabées au Khirbet-el-Medieh jadis Modin.

Revue et Magasin de Zoologie, No. 10, 1872.

Dr. Jousseaume.—Étude des genres *Teinostoma*, *Cyclostoma* et *Skenea*. (Several Indian species are described).

• The American Journal of Science, No. 22, 1872.

C. H. F. Peters.—Discovery of a new planet.

No. 23, 1872.

Joseph Leconte.—A Theory of the Formation of the great Features of the Earth's Surface. *C. A. Young*.—Catalogue of bright Lines in the Spectrum of the Solar Atmosphere. *J. C. Draper*.—Growth or Evolution of structure in seedlings.

The Ibis, October, 1872.

• *A. V. Walden*.—On a collection of birds recently made by Mr. A. H. Everett in North Borneo. *O. Salvin*.—Index to Ornithological Literature of 1871.

The Annals and Magazine of Natural History, Dec. 1872.

O. P. Cambridge.—On a new family and genus and two new species of Thelyphomides, from Ceylon. *Dr. A. Gunther*.—On some new species of Reptiles and Fishes collected by J. Brechley in Mongolia, Feejee Islands &c. *Dr. A. Gunther*.—On Psammopores and Cnidon. *C. Ritsema*.—On *Criuides Sommeri* and *Tarsolepis Remicauda*, in answer to Mr. Butler's remarks.

Conchologia Indica, Part 5.

APPENDIX.

LIST OF MEMBERS
OF THE
ASIATIC SOCIETY OF BENGAL,-
ON THE 31ST DECEMBER, 1872. .

LIST OF ORDINARY MEMBERS.

The * distinguishes Non-Subscribing, the † Non-Resident Members,
and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Gentlemen who are proceeding to Europe, with the intention of not returning to India, are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with rule 14 B. of the By-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.

1860 Dec.	5.	Abdullatif Khán Bahádur, Maulavi.	Calcutta
1868 Sept.	2.	†Adam, R. M., Esq.	Sambhar Lake, viá Jaipur
1869 Jan.	20.	*Adley, C. C., Esq., C. E., Nerbudda Coal & Iron Co.	Europe
1860 July	4	†Ahmad Khan, Sayyid, Bahádur.	Benares
1872 April	3	†Ahsanullah Khwajah.	Dacca
1860 April	4	†Aitchison, J. E. T., Esq., M. D.	Ludiánah
1866 Jan.	17.	Allan, Lieut-Col. A. S.	Calcutta
1869 Oct.	6.	*Allardyce, A., Esq.	Europe
1871 June	7	†Alexander, J. W., Esq.	Benares
1860 Oct.	3	Amir Ali Khán, Bahádur, Munshi.	Calcutta
1865 Jan.	11.	Anderson, Dr. J., F. L. S.	Calcutta
1872 June	5	Anderson, A. Esq.	Futtehghur
1861 Sept.	4	*Asghar Ali Khán Bahádur, Nawáb.	Europe
1869 Feb.	3	Ashton, Rev. J. P.,	Calcutta
1871 Sept.	6	†Atkinson, E. T., Esq., C. S.	Allahabad
1855 July	4.	Atkinson, W. S., Esq., M. A., F. L. S.	Calcutta
1869 Feb.	3.	†Attar Singh Bahádur, Sirdár.	Loodiana
1870 Feb.		†Baden, Powell H., Esq., C. S.	Lahore
1869 Aug.		Baláichánd Sínga, Bábu.	Calcutta
1865 Nov.		†Ball, V., Esq., Geol. Survey.	Geol. S. Office
1860 Nov.		Banerjea, Rev. K. M.	Calcutta
1869 Dec.		†Barker, R. A., Esq., M. D.	Beerbhoom
1866 Sept.		Bashiruddin, Sultán, Muhammad.	Chinsurah
1869 Feb.		†Baxter, J. B., Esq., M. R. C. S.	Calcutta
1869 May		Bayley, E. C., The Hon'ble., B. C. S., C. S. I.	Calcutta
1861 Feb.		†Bayley, S. C., Esq., B. C. S.	Patna
1864 Sept.		†Beames, J., Esq., B. C. S.	Balasore

Date of Election.			
1841 April 7.	Beaufort, F. L., Esq., B. C. S.	Calcutta	
1867 July 8.	†Belletty, N. A., Esq.	Mymensing	
1869 Jan. 20.	†Bellew, Dr. P. F.	Bombay Mint	
1871 March 1.	Benedict, E., Esq., C. E.	Calcutta	
1862 Oct. 8.	Bernard, C. E., Esq., B. C. S.	Calcutta	
1872 Aug. 7.	Beverley H., Esq., C. S.	Calcutta	
1862 June	†Bhau Daji, Dr.	Bombay	
1864 Nov.	Bhudeva Mukerjea, Bábú.	Chingurah	
1872 Nov.	Bisset, Lieut. W. S. S., R. E.	Calcutta	
1857 Mar.	Blanford, H. F., Esq., A. R. S. M., F. G. S.	Calcutta	
1859 Aug.	†Blanford, W. T., Esq., A. R. S. M., F. G. S., Geol. Survey.	Europe	
1864 April 6.	Blochmann, H., Esq., M. A.	Calcutta	
1871 April 5	†Bourne, T. W., Esq.	Central Provinces	
1872 June 5.	†Bourne, Lieut. J. H.	Shillong	
1871 April 5.	†Bourne, Walter, Esq., C. E.	Madapoor	
1868 Jan. 15.	Boxwell, J., Esq., C. S.	Serampore	
1860 March 2.	†Brandis, Dr. D.	Europe	
1870 Aug. 3	*Broadley, A. M., Esq.,	Europe	
1872 June 5	†Brooks, W. E., Esq., C. E.	Assensole	
1871 Jan. 4	Brough, R. S., Esq.	Calcutta	
1866 Jan. 17.	†Brown, Col. D.	Moulmein	
1866 Nov. 7	†Browne, Lieut.-Col. Horace A.	Thayetmo	
1866 June 6.	†Brownfield, C., Esq.	Kamrup	
1868 June 3.	†Buck, E. C., Esq., C. S.	Cawnpur	
1871 July 5.	†Buckland, C. T., Esq., C. S.	Burdwan	
1866 June 6.	†Buckle, Dr. H. B., C. B.	Dacca	
1871 Sept. 6.	†Buckle, H., Esq.	Akyab	
1872 Jan. 3.	*Butcher, W. D., Esq., M. R. C. S.	Europe	
1869 Jan. 20.	†Cadell, A., Esq., B. A., C. S.	Muzaffarnagar	
1863 June 3.	Campbell, The Hon'ble G.	Calcutta	
1860 Jan.	*Carnac, J. H. Rivett, Esq., B. C. S.	Europe	
1868 Aug.	†Chandramohan, Gosvámi, Pandit.	Gowhati	
1863 Aug.	†Chandranáth Ráy, Rája.	Nator	
1871 Sept.	†Chisholm, R. F., Esq.	Madras	
1868 Feb.	†Clark, Major E. G., Bengal Staff Corps.	Kherree Oudh	
1871 March 1.	†Clarke, C. B., Esq.	Dacca	
1872 Aug. 7.	†Clutterbuck, Capt. F. St. Quintin.	Attock	
1868 Nov. 4.	*Cole, Lieut. H. H., R. E.	Europe	
1862 April 2.	Colles, J. A. P., Esq., M. D.	Calcutta	
1871 Oct. 4.	†Cooke H. G., Esq., C. S.	Chittagong	
1868 Dec. 2.	†Cooke, J. E., Esq.	Haidarabad	
1870 June 1.	Couch, The Hon'ble Sir R.	Calcutta	
1872 June 5.	*Court, Major M. H.	Europe	
1858 March 4.	*Cowell, E. B., Esq., M. A.	Europe	
1871 April 5.	Curtoys, W. J., Esq.	Calcutta	

Date of Election.		
1847 June	2.	†Dalton, Col. E. T., C. S. I., Staff Corps.
1870 May	4.	†Damant, G. H., Esq., C. S.
1861 March	6.	Davey, N. T. E., Revenue Survey.
1861 Nov.	6.	†Davies, The Hon'ble R. H., C. S. I., B. C. S.
1869 April	7.	†Day, Dr. F., F. L. S., F. Z. S.
1856 June	4.	†DeBourbel, Major R., Royal Engrs.
1870 Feb.	2.	†DeFabeck, F. W. A., Esq., B. M. Service.
1872 Aug.	7.	Dejoux, P., Esq.
1869 Oct.	6.	†Delmerick, J. G., Esq.
1864 July	6.	Devendra Mallik, Babu.
1862 May	7.	†Dhanapati Singh Dughar, Ráy Bahádur.
1853 Sept.	7.	Dickens, Col. C. H., C. S. I.
1871 March	1.	Dijendranath Thakur, Babu.
1870 May	4.	Dobson, G. E., Esq., B. A., M. B.
1859 Sept.	7.	†Douglas, Col. C.
1869 Feb.	3.	*Drew, F., Esq.
1870 March	8.	†Duke of Edinburgh, His Royal Highness.
1867 June	5.	*Duthoit, W., Esq., C. S.
1868 Oct.	7.	†Eddowes, W., Esq., M. D.
1863 May	6.	Edgar, J. W., Esq., B. C. S.
1865 Feb.	1.	*Egerton, Ph., Esq., B. C. S.
1846 Jan.	7.	†Elliot, Sir Walter, late M. C. S.
1859 Nov.	2.	†Elliot, C. A., Esq., B. C. S.
1871 Oct.	4.	†Evezard, Col. G. E.
1863 Oct.	7.	Ewart, J., Esq., M. D.
1851 May	7.	*Fayrer, Dr. J., C. S. I.
1863 Jan.	15.	†Fedden, Francis, Esq., Geol. Survey.
1868 May	6.	†Field, C. D., Esq., M. A., C. S.
1869 Sept.	1.	†Fisher, J. H., Esq., C. S.
1872 Dec.	4.	†Forbes, Major, J. G., R. E.
1867 April	3.	†Ford, Lieut.-Col. B.
1861 Feb.	6.	†Forest, R., Esq., Civil Engineer.
1869 Oct.	12.	†Forlong, Lieut.-Col. J. G. R., M. S. C.
1863 June	3.	†Forsyth, T. D., Esq., C. B.
1871 Nov.	1.	†Fofter, J. M., Esq., M. R. C. P.
1869 Sept.	1.	†Fryer, Capt. G. E., Dy. Commissioner.
1859 Dec.	7.	Futteh Ali, Maulavi.
1867 Sept.	4.	†Fyfe, The Rev. W. C.
1849 Sept.	5.	*Fytche, Major Genl. A., C. S. I.,
1871 June	7.	Gangasprasad Sinha, Babu.
1871 Aug.	2.	†Gangasprasad, Munshi.
1859 Aug.	3.	Gastrell, Col. J. E., Supdt., Rev. Survey.
1862 Feb.	5.	Gauradas Basák, Babu.
1867 Sept.	4.	†Gauvain, Capt. V.
1867 Dec.	4.	Gay, E., Esq., M. A.
		Chota Nagpur
		Dinajepore
		Howrah
		Lahore
		India
		Oudh
		Jaipur
		Calcutta
		Delhi
		Calcutta
		Azimganj
		Calcutta
		Calcutta
		Calcutta
		Meerut
		Europe
		Europe
		Europe
		Erinpur
		Calcutta
		Europe
		Europe
		Allahabad
		Poona
		Calcutta
		Europe
		Geol. S. Office
		Chittagong
		Raipore
		Lucknow
		Madras
		Dehra
		Lucknow
		Oudh
		Europe
		Sandoway
		Calcutta
		Europe
		Europe
		Calcutta
		Moradabad
		Calcutta
		Calcutta
		Calcutta
		Calcutta

Date of Election.		
1859 Sept. 7.	Geogheghan, J., Esq., B. C. S.	Calcutta
1869 Feb. 3.	†Giriprasád Singh, Thákur.	Allighur
1861 Feb. 6.	†Godwin-Austen, Major H. H., Topographical Survey.	East-Assam
1869 Oct. 6.	†Gomes, A. D. B., Esq.	Sunderbuns
1872 Nov. 6.	†Gordon, C. B. P., Esq.	Berhampore, Ganjam
1862 July 2.	†Gordon, J. D., Esq., C. S. I., C. S.	Mysore
1869 July 7.	†Gordon, Robert, Esq., C. E.	Henzaday
1871 March 1.	†Gough, A. E., Esq.	Benares
1871 March 1.	†Govindacoomar, Chaudhari.	Dacca
1863 Nov. 4.	†Gowan, Lieut.-Col. J. Y.	Allahabad
1869 Oct. 6.	*Gray, R., Esq., M. B.	Europe
1867 June 5.	*Gregory, Capt. J.,	Europe
1866 June 6.	Gribble, T. W., Esq., B. C. S.	Calcutta
1861 Sept. 4.	†Griffin, L. H., Esq., B. C. S.	Lahore
1860 Nov. 7.	†Griffith, R. T. H., Esq., M. A.	Benares
1861 Feb. 6.	†Growse, F. S., Esq., M. A., B. C. S.	Muttra
1871 Jan. 4.	Gunendranath Thakur, Babu.	Calcutta
1864 Dec. 5.	†Gurucharan Dás, Bábu,	Backergunge
1871 June 7.	Habiburrahmán, Maulavi.	Calcutta
1867 July 3.	†Hackct, C. A., Esq., Geol. Survey.	Geol. S. Office.
1869 April 3.	†Hæberlin, The Rev. C.	Ranee
1866 Jan. 17.	*Hamilton, Lieut.-Col. T. C.	Europe
1855 March 7.	†Hamilton, R., Esq.	Wifrdah
1871 July 5.	Hamilton, Col. O.	Calcutta
1861 March 1.	†Harachandra Chaudhari, Babu.	Mymensing
1866 Nov. 1.	Harendra Krishna Bahádur, Kumár.	Calcutta
1871 Feb. 1.	†Harkness, T. F., Esq., C. S.	Azamgarh
1861 Feb. 6.	†Harrison, A. S., Esq., B. A.	Muir's College, Allahabad
1859 Oct. 12.	†Haughton, Col. J. C., C. S. I.	Kooch Behar
1862 Aug. 6.	Heeley, W. L., Esq., B. A., C. S.	Calcutta
1872 May 1.	Heilgers, W., Esq.	Calcutta
1853 July 6.	*Herschel, W. J., Sir, Bart., B. C. S.	Europe
1868 Aug. 5.	†Hobart, R. T., Esq., C. S.	Etah
1872 Nov. 6.	†Holcombe, Lieut. W. A.	Manbhúm
1872 Dec. 4.	†Hoernle, Rev. A. F. R., Ph. D.	Benares
1868 Nov. 4.	*Holroyd, Capt. W. R. M.	Europe
1863 Jan. *15.	*Howell, M. S., Esq., C. S.	Europe
1871 April 5.	*Howell, A. P., Esq., C. S.	Europe
1866 Feb. 7.	Hoyle, G. W., Esq.	Calcutta
1867 Aug. 7.	†Hughes, T. H., Esq., A. R. S. M., F. G. S. Geol. Survey of India.	Geol. S. Office
1866 Jan. 17.	†Hughes, Captain W. G., M. S. C.	Arracan,
1870 Jan. 5.	Hume, Allan O., Esq., C. B., C. S.	Calcutta
1870 June 1.	Hunter, W. W., Esq., LL. D., C. S.	Calcutta

Date of Election.		
1868 April, 1.	Hyde, Lieut.-Col. H., R. E.	Calcutta
1869 Sept. 1.	*Hyde, E., Esq.	Europe
1872 Dec. 4.	*Ibbetson, D. C. J. Esq., C. S.	Europe
1870 April 6.	*Innes, F. W., Esq., M. D., C. B.	Europe
1866 March 7.	*Irvine, W., Esq., C. S.	Europe
1862 Oct. 8.	†Irwin, Valentine, Esq., C. S.	Cuttack
1871 March 1.	Isaac, T. S. Esq., C. E.	Calcutta
1853 Dec. 7.	†Isvariprasād Singh Bahādur, Rāja.	Benares
1865 June 7.	†Jaykissen Dās Bahādur, Rāja, C. S. I.	Allighur
1866 Feb. 7.	†Johnson, W. H., Esq.	Sialkote
1862 March 5.	†Johnstone, Major J. W. H., Dy. Commis- sioner.	Bunnoo, Panjab
1867 Dec. 4.	†Johnstone, Capt. J.	Europe
1869 April 7.	Kabiruddin Ahmad, Maulavi	Calcutta
1871 May 3.	Kaliprasan Ghosh Babu.	Calcutta
1861 Dec. 4.	Kempson, M., Esq., M. A.	Bareilly
1867 Dec. 4.	*King, G., Esq., M. B.	Europe
1867 March 6.	†King, Capt. H. W.	P. & O. Co's Office
1862 Jan. 15.	†King, W., Jr., Esq., Geol. Survey of India.	Geol. Surv. O.
1867 March 6.	†Knox, G. E., Esq., C. S.	Allahabad
1860 May 5.	Kurz, S., Esq.	Calcutta
1869 Sept. 1.	*Latham, G., Esq., C. E.	Europe
1852 April 7.	*Lees, Lieut.-Col. W. N., LL. D.	Europe
1868 Feb. 5.	*Lees, L. H., Esq., M. D.	Europe
1859 Dec. 7.	Leonard, H., Esq., M. A.	Calcutta
1870 July 6.	Lethbridge, E., Esq., M. A.	Calcutta
1869 June 2.	*Leupolt, J. C., Esq., C. S.	Europe
1865 June 7.	†Lewin, Capt. T. H.	Chittagong
1864 Nov. 2.	Locke, H. H., Esq.	Calcutta
1869 April 7.	†Lockwood, E. D., Esq., C. S.	Monghyr
1866 Jan. 17.	†Low, J. Esq., G. T. S.	Almora
1869 July 7.	†Lyll, C. J., Esq., B. A., C. S.	Allahabad
1870 April 6.	†Lyman, B. Smith, Esq.	America
1868 Dec. 2.	*Macauliff, M., Esq., B. A., C. S.	Europe
1866 June 6.	Macdonald, Major J., Staff Corps.	Calcutta
1848 April 5.	†MacLagan, Col. R., R.E., F.R.S.E., F.R.G.S.	Lahore
1867 July 3.	Macnamara, Dr. C.	Calcutta
1870 May 4.	†Macnaghten, C., Esq.	Rajkote College, Kattywar
1867 April 3.	Mahendralāl Sircār, Dr.	Calcutta
1867 April 3.	†Mainwaring, Lieut.-Col. G. B.	Darjeeling
1862 Sept. 3.	†Mallet, F. R., Esq., Geol. Survey.	Geol. S. Office
1852 Nov. 3.	Manickjee Rustamjee, Esq.	Calcutta

Date of Election.		
1872 Nov. 6.	†Man, E. H., Esq.	Pott Blair
1869 July 7.	†Markham, A. M., Esq., C. S.	Nynsee Tal
1860 March 7.	†Medlicott, H. B., Esq., F. G. S., Geol. Survey of India.	Geol. S. Office
1871 Sept. 6.	†Miles, Capt. S. B.	Bombay
1870 July 6.	Miller, A. B., Esq.,	Calcutta
1867 June 5.	Milman, R., D. D., The Right Rev. Lord Bishop of Calcutta.	Calcutta
1867 March 6.	†Montgomerie, Major T. G., R. E.	Dera Doon
1854 Dec. 6.	†Morris, G. G., Esq., B. C. S.	Backergunj
1854 Oct. 11.	†Muir, Sir W., K. C. S. I., B. C. S.	Allahabad
1862 July 2.	†Napier of Magdala, Lord R., General, G. C. S. I., G. C. B.	India
1871 Oct. 4.	* Neil, Dr. A.	Europe
1869 May 5.	Nevill, G., Esq., C. M. Z. S.	Calcutta
1865 Feb. 1.	†Newal Kishwar, Munshi.	Lucknow
1870 Feb. 5.	†Newman, J. H., Esq., M. D.	Ajmere
1871 Jan. 4.	*Newton, Isaac, Esq.	Europe
1872 May 1.	†Niranjan Mukerji, Babu.	Benares
1869 July 7.	†Nursing Rao, A. V., Esq.	Vizagapatam
1871 July 5.	†Oates, E. W., Esq., C. E.	Thayetmyo
1851 June 4.	Oldham, T., Esq., LL. D., F. R. S.,	Calcutta
1867 Aug. 7.	*Oldham, R. A., Esq., C. E.	Europe
1864 Mar. 2.	Palmer, Dr. W. J.	Calcutta
1862 May 7.	*Partridge, S. B., Esq., M. D.	Europe
1871 Dec. 6.	†Peal, S. E., Esq.	Sibsagar, Assam
1867 Mar. 6.	Pearimohan Mukarji, M. A., Babú.	Uttarparah
1860 Feb. 1.	†Pearse, Lieut-Col. G. G.	Europe
1868 Nov. 4.	†Pearson, C. E.	Rawal Pindi
1869 July 7.	Poll, S., Esq.	Calcutta
1864 Mar. 2.	Pellew, F. H., Esq., C. S.	Hooghly
1865 Sept. 6.	†Peppé, J. H., Esq.	Ranchi
1868 May 6.	Peterson, F. W., Esq.	Calcutta
1835 July 1.	†Phayre, Major G., Sir A. P., K. C. S. I., C. B.	Europe
1864 Nov. 2.	Phear, The Hon'ble J. B.	Calcutta
1869 Feb. 3.	†Pickford, J., Esq., M. A.	Madras
1868 April 1.	†Pramathanáth Ráy, Kumár.	Digapati
1872 Dec. 4.	Prananath Pandit, Babu.	Bhawánpore
1869 Feb. 3.	Pratápachandra Ghosha, B. A.	Calcutta
1871 June 7.	†Pratt, Capt. C. S., Staff-Corps.	Morar-Gwalior
1862 Oct. 8.	†Pulinavihúri Sen, Babú.	Berhampore
1856 Mar. 5.	Rájendralála Mitra, Babú	Calcutta
1868 Jan. 15.	†Rákhaldass Haldar, Babú.	Ranchi
1871 June 7.	Rámakrishna Dás, Babú.	Calcutta

Date of Election.			
1837 Feb.	1.	Ramánáth Thákur, The Hon'ble Raja.	Calcutta
1836 Jan.	17.	*Rattray, A., Esq.	Europe
1860 Mar.	7.	†Reid, H. S., Esq., C. S.	Allahabad
1871 July	5.	†Reid, J. R., Esq., C. S.	Azimgur
1872 April	3.	†Richard, Dr. V.	Balasore
1868 April	1.	Robb, G., Esq.	Calcutta
1863 April	1.	†Robertson, C., Esq., C. S.	Mirzapur
1865 Feb.	1.	Robinson, S. H., Esq.	Calcutta
1870 Dec.	7.	Rogers, A., Esq.	Calcutta
1871 May	3.	*Rogers, Capt. B.	Europe
1869 July	7.	†Ross, Lieut. J. C., R. E.	Boolundshuhur
1870 Jan.	5.	†Ross, Alexander G., Capt. Staff Corps.	Edwardesabad
1871 April	5.	Rundall, Col. F. H.	Calcutta
1871 Dec.	6.	†Samuells, Capt. W. L.	Hazareebaugh
1871 May	3.	Sanderson, C., Esq.	Calcutta
1872 Feb.	7.	†Sashagiri Sastri M. B. A.	Madras
1870 May	4.	Satyánand Ghoshál, Rája.	Calcutta
1864 June	1.	*Saunders, J. O'B., Esq.	Europe
1864 Dec.	6.	†Saxton, Col. G. H., F. G. S., M. S. Corps.	Ootacamund
1870 May	4.	†Schlich, Dr. W.	Calcutta
1869 Feb.	3.	Schwendler, L., Esq.	Calcutta
1860 July	4.	†Shelverton, G., Esq.	Waltair, near Vizagapatam
1863 April	1.	†Showers, Lieut.-Col. C. L.	Umballa
1866 June	6.	†Sime, J., Esq., B. A.	Delhi
1872 Aug.	7.	†Skrefsrud, Rev. L. O.	Rampur Haut
1864 Sept.	7.	†Sladen, Major E. B.	Amherst
1866 June	6.	†Smart, R. B., Esq., Rev. Survey.	Raepur, C. P.
1865 July	5.	Smith, D. Boyes, Esq., M. D.	Calcutta
1868 April	1.	Smith, McLaren W., Esq.,	Calcutta
1854 Sept.	6.	†Spankie, The Hon'ble R., B. C. S.	Allahabad
1864 Mar.	2.	†Spearman, Capt. H. R.	Prome
1867 May	1.	†Steel, Capt. E. H., R. A.	DeraGhaziKhan
1872 July	3.	†Stephen, Carr, Esq.	Delhi
1863 Sept.	2.	†Stewart, R. D., Esq.	Serajgunj
1864 April	6.	†Stewart, J. L., Esq., M. D.	Panjab
1870 April	6.	Stewart, R., Esq.	Calcutta
1870 Sept.	7.	†St. John, R. T., Esq.	Akyab
1861 Sept.	4.	Stokes, Whitley, Esq.	Calcutta
1863 Nov.	4.	Stoliczka, F., Esq., Ph. D., F. G. S.,	Calcutta
1848 May	3.	*Strachey, Major General, R., C. S. I., C.B.	Europe
1869 Feb.	3.	*Strachey, The Hon'ble Sir J., K. C. S. I.	Europe
1859 Mar.	2.	†Stubbs, Major F. W., Royal Artillery.	Lucknow
1858 July	7.	†Sutherland, H. C., Esq., B. C. S.	Sylhet
1872 Dec.	4.	†Swetenham, Capt. E.	Prome
1864 Aug.	11.	Swinhoe, W., Esq.	Calcutta
1863 Sept.	3.	Syámácharan Sarcár, Bábú.	Calcutta

Date of Election.		
1865 Sept.	6.	Tawney, C. H., Esq., M. A.
1865 April	5.	†Taylor, R., Esq.
1860 May	2.	Temple, The Hon'ble Sir R., K. C. S. I., B. C. S.
1859 Mar.	2.	†Theobald, W., Esq., Geological Survey.
1869 Oct.	6.	†Thomson, A., Esq.
1863 Mar.	4.	*Thompson, Major G. H., Bengal Staff Corps.
1863 June	4.	*Thornton, T. H., Esq., D. C. L., C. S.
1847 June	2.	Thuillier, Col. H. L., Royal Artillery, F. R. S., C. S. I.
1865 July	5.	†Tolbort, T. W. H., Esq., C. S.
1865 July	5.	Tonnerre, Dr. C. F.
1871 April	5.	Trefftz, Oscar, Esq.
1861 June	5.	†Tremlett, J. D., Esq., M. A., C. S.
1872 July	3.	Trevor, W. S., R. E.
1861 Sept.	4.	Tween, A., Esq., Geological Survey.
1863 May	6.	*Tyler, Dr. J.
1869 June	2.	†Udayachand Datt, Bábú.
1868 Sept.	2.	Van Cutsem, E. Ch. Esq.
1860 May	2.	†Vanrenen, Major A. D., Bengal Staff Corps.
1864 Feb.	3.	†Verchère, A. M., Esq., M. D.
1864 April	6.	†Vijayarāma Gajapati Rāj Munníá Sultán Bāhadur, Mahārājah Mirza.
1870 June	1.	†Vrindāvanachandra Mandala, Bábú.
1871 Feb.	1.	†Waagen, Dr. W.
1869 Aug.	4.	Wāhid Alí, Prince Jahán Qadr Muhammad, Bahádur.
1865 Nov.	1.	Waldie, D., Esq., F. G. S.
1861 May	1.	†Walker, Col. J. T., R. E., F. R. S.
1863 Oct.	7.	Waller, W. K., Esq., M. B.
1862 Jan.	15.	†Ward, G. E., Esq., B. C. S.
1865 May	3.	Waterhouse, Capt. J., B. S. C.
1869 Sept.	1.	*Westland, J., Esq., C. S.
1867 Feb.	6.	*Westmacott, E. V., Esq., B. A., C. S.
1862 Oct.	8.	†Wheeler, J. T., Esq.
1867 Aug.	7.	†Wilcox, F., Esq.
1867 Jan.	16.	†Williamson, Lieut. W. J.
1867 Mar.	6.	Willson, W. G., Esq., B. A.
1871 Mar.	1.	†Willson, James, Esq., B. A.
1870 Aug.	3.	Wilson, R. H., Esq., C. S.
1866 Mar.	7.	†Wise, Dr. J. F. N.
1867 July	3.	†Wood, Dr. J. J.,
1870 Jan.	5.	Wood-Mason, J., Esq., F. G. S.
1861 May	7.	Woodrow, H., Esq., M. A.
1869 Sept.	1.	Yadulál Mallik, Bábú.
		Calcutta
		Madras
		Calcutta
		B. Burma
		Faizabad
		Europe
		Europe
		Calcutta
		Bunnoc
		Calcutta
		Calcutta
		Moozuffergurh
		Calcutta
		Calcutta
		Europe
		Nowakhali
		Calcutta
		Moradabad
		Benares
		Vizianagram
		Balasore
		Europe
		Garden Reach
		Calcutta
		Dehra Doon
		Calcutta
		Furruckabad
		Calcutta
		Europe
		Europe
		Burma
		Purulia
		Garo Hills
		Calcutta
		Geol. Survey
		Calcutta
		Dacca
		Ranchi
		Calcutta
		Calcutta

Date of Election.				
1868	June	8.	Yatendra Mohun Tagore, Rajah Bahádúr.	Calcutta
1867	Mar.	6.	†Yogendranáth Mallik, Bábu.	Andul

HONORARY MEMBERS.

Date of Election.				
1825	Mar.	9.	M. Garcin de Tassy, Memb. de l'Institut.	Paris
1821	"	6.	Sir John Phillippart.	London
1826	July	1.	Count de Noe.	Paris
1831	"	7.	Prof. C. Lassen.	Bonn
1835	May	6.	Prof. Lea.	Philadelphia
1842	Feb.	4.	Dr. Ewald.	Göttingen
1842	"	4.	Right Hon'ble Sir Edward Ryan, Kt.	London
1843	Mar.	30.	Prof. Jules Mohl, Memb. de l'Institut.	Paris
1847	Sept.	1.	Col. W. Munro.	London
1847	Nov.	3.	His Highness the Nawab Nazim of Bengal.	Murshidabad
1848	Feb.	2.	Dr. J. D. Hooker, R. N., F. R. S.	Kew
1848	Mar.	8.	Prof. Henry.	Princeton, U. S.
1853	April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B.	London
1858	July	6.	B. H. Hodgson, Esq.	Europe
1859	Mar.	2.	The Hon'ble Sir J. W. Colville, Kt.	Europe
1860	Mar.	7.	Prof. Max Müller.	Strassburg
1860	Nov.	7.	Mons. Stanislas Julien.	Paris
1860	"	7.	Dr. Robert Wight.	London
1860	"	7.	Edward Thomas, Esq.	London
1860	"	7.	Dr. Aloys Sprenger.	Bern
1860	"	7.	Dr. Albrecht Weber.	Berlin
1865	Sept.	6.	Edward Blyth, Esq.	Europe
1868	Feb.	5.	Genl. A. Cunningham, C. S. I.	India
1868	"	5.	Prof. Bápu Déva Sastri.	Benares
1868	"	5.	Dr. T. Thomson,	London
1868	"	2.	A. Grote, Esq., C. S.	London
1871	"	7.	C. Darwin, Esq.	London
1872	"	1.	Sir G. B. Airy.	London
1872	June	5.	Prof. T. Huxley.	London

CORRESPONDING MEMBERS.

1844	Oct.	2.	Macgowan, Dr. J.	Europe
1856	June,	4.	Kramer, Herr A. von,	Alexandria
1856	"	4	Porter, Rev. J.	Damascus

Date of Election.				
1856	June	4.	Schlagintweit, Herr H. von.	Munich
1856	"	4.	Smith, Dr. E.	Beyrout
1859	"	4.	Tailor, J., Esq.	Bussorah
1856	"	4.	Wilson, Dr.	Bombay
1857	Mar.	4.	Neitner, J., Esq.	Ceylon
1858	Mar.	3.	Schlagintweit, Herr R. von.	Giesen
1859	Nov.	2.	Frederick, Dr. H.	Batavia
1859	May	4.	Bleeker, Dr. H.	Europe
1860	Feb.	1.	Baker, The Rev. H.	E. Malabar
1860	"	1.	Swinhoe, R., Esq., H. M.'s Consul.	Amoy
1860	April	1.	Haug, Dr. M.	Punah
1861	July	3.	Gösche, Dr. R.	Berlin
1862	Mar.	5.	Murray, A., Esq.	London
1863	July	4.	Barnes, R. H., Esq.	Ceylon
1866	May	7.	Schlagintweit, Prof. E. von.	Munich
1866	"	7.	Sherring, Rev. M. A.	Benares
1868	Feb.	5.	Foucaux, M. F. H.	Paris
1868	"	5.	Hölmbœ, Prof.	Christiania

ASSOCIATE MEMBERS.

1835	Oct.	7.	Stephenson, J., Esq.	Europe
1838	Feb.	7.	Karâmat Ali, Sayyid.	Hooghly
1843	Dec.	6.	Long, Rev. J.	Europe
1865	May	3.	Dall, Rev. C. H.	Calcutta

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

Rule 14, A.—In the event of an Ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 Rupees per annum, commutable into a single payment of Rs. 100, provided that if any such Member shall hereafter return to India, he shall thereupon become liable to pay his original subscriptions, subject to the operation of rule 10 B.

Rule 14, B.—After the lapse of three years from the date of a Member leaving India, if no intimation of his wishes shall, in the interval, have been received by the Society, his name shall be removed from the list of Members.

	<i>Date of Leaving India.</i>
Abbot, Major General J., R. A.	1868
Allan, C., Esq., B. C. S.	1857
Alabaster, C., Esq.	1860
Anderson, W., Esq.	1868
Anderson, Lieut.-Col. W. B.	1854
Asphar, J. J. T., Esq.	1862
Baker, Col. W. E., Bengal Engineers.	1857
Barry, Dr. J. R.	1864
Batten, J. H., Esq., B. C. S.	1866
Baynes, J., Esq.	1869
Beadon, The Hon'ble Sir Cecil., B. C. S.	1867
Beckwith, J., Esq.	1858
Benson, Lieut.-Col. R.	1854
Birch, Major General Sir R. J. H., K. C. B.	1863
Blagrove, Major T. C., 26th Regiment, B. N. I.	1859
Blane, Col. Sir S. J.	1869
Boycott, Dr. T., B. M. S.	1860
Brandreth, The Hon'ble J. E. L.	1868
Broderick, H. C., Esq., M. D.	1868
Brodie, Capt. T., 5th Regiment, B. N. I.	1853
Campbell, Dr. A.	1862
Cleghorn, Dr. H.	1867
Colvin, J. H. B., Esq., B. C. S.	1853
Cox, W. H., Esq.,	1866
Crockett, Oliver R., Esq.	1861

* These names will be removed from the next list of members unless intimation is meanwhile received from any of the members of their desire to retain the privileges of ordinary members under the operation of Rule 14 A.

	<i>Date of Leaving India.</i>
Dalrymple, F. A., Esq.	1865
Devereux, The Hon'ble H. B., B. C. S.	1862
Dunlop, H. G., Esq.	1866
Earle, Capt. E. L., Bengal Artillery.	1864
Eatwell, Dr. W. C. B.	1861
Ellis, Lieut.-Col. R. R. W.	1861
Edgeworth, M. P., Esq., B. C. S.	1862
Elphinstone, Capt. M. W., 30th Regiment, B. N. I.	1868
Erskine, The Hon'ble C. J., Bombay C. S.	1863
Erskine, Major W. C. B.	1859
Eyre, Col. Vincent C. B.	1863
Fitzwilliam, The Hon'ble W. S.	1863
Frederic Prince of Schleswig Holstein, H. R. H.	1869
Frere, Sir H. Bartle, K. C. B., B. C. S.	1867
Grant, The Hon'ble Sir J. P., K. C. B.	1862
Grant, T. R., Esq.	1862
Gladstone, W., Esq.	1856
Goodeve, E., Esq., M. D.	1865
Guthrie, Col. C. S.	1867
Hall, F. E., Esq., M. A., D. C. L.	1862
Hamilton, Col. G. W.	1867
Hannington, Col. J. C., 63rd Regiment, N. I.	1862
Hardie, Dr. G. K.	1861
Harington, The Hon'ble H. B.	1865
Henry, N. A., Esq.	1867
Hichens, Major W., Royal Engineers.	1857
Hyatt, Dr., B. N.	1868
Jackson, W. B., Esq., B. C. S.	1854
Johnstone, J., Esq.	1854
Jones, R., Esq.	1862
Kane, H. S., Esq.	1863
Kay, Rev. W.	1864
Laing, The Hon'ble S.	1862
Lindsay, E. J., Esq.	1860
Liebig, Dr. G. von.	1859
Lovett, Major B., R. E.	1866
Lushington, F. A., Esq.	1861
Macrae, Dr. A. C.	1869
Maine, The Hon'ble Sir H. S.	1869
Mair, D. K., Esq.	1865

	<i>Date of Leaving India.</i>
Marshman, J. C., Esq.	1856
McClelland, Dr. J.	1865
Middleton, J., Esq.	1857
Miles, A. J. M., Esq., B. C. S.	1856
Money, D. J., Esq., B. C. S.	1859
Muir, J., Esq.	1854
Nicholls, Capt. W. T., 29th Regiment, M. N. I.	1861
O'Shaughnessy, Sir W. R.	1857
Ouseley, Major W. R.	1858
Paul, J., Esq.	1869
Petit, Mons. Eugene,	1859
Place, Mons. V.	1868
Riddell, The Hon'ble H. B., B. C. S.	1867
Rogers, Capt. T. E.	1857
Schiller, F., Esq.,	1869
Scott, Col. E. W. S.	1862
Sherwill, Lieut.-Col. W. S., 66th Regiment, B. N. I.	1861
Smith, Col. J. F.	1857
Stephen, Major J. G., 8th N. I.	1859
Thompson, J. G., Esq.	1865
Thurlow, The Hon'ble T. J. H.	1863
Torrans, Col. H. D.	1866
Trevelyan, The Right Hon'ble Sir C., K. C. B.	1865
Trevor, The Hon'ble, C. B., B. C. S.	1867
Wall, P. W., Esq., C. E.	1864
Ward, J. J., Esq., C. S.	1861
Warrand, R. H. M., Esq., B. C. S.	1865
Watson, J., Esq., B. C. S.	1859
Waugh, Major General Sir A. S., C. B., F. R. S.	1861
Wilmot, E. W., Esq.	1869
Wortley, Major A. H. P.	1861
Young, Lieut.-Col. C. B.	1862
Yule, Col. H., R. E.	1862

LOSS OF MEMBERS DURING 1872.

BY RETIREMENT.

W. Oldham Esq., LL. D., C. S.	Europe
Lieut.-Col. J. J. McLeod Innes.	Calcutta
Lieut.-Col. D. J. F. Newall, R. A.	Gwalior
Dr. G. W. Leitner.	Lahore
J. A. Aldis, Esq.	Calcutta
Khalifah Sayyid Muhammad Husain.	Patiala
The Hon'ble W. Markby.	Calcutta
W. E. Ayrton, Esq.	Europe
J. A. Briggs, Esq.	Calcutta
J. Smith, Esq., C. S.	Ghazipur
F. N. Macnamara, Esq., M. D.	Calcutta
Major J. M. Graham.	Dhurrung
C. B. Saunders, Esq., C. B.	Hyderabad
M. L. Ferrar, Esq., C. S.	Fyzabad
Dr. S. M. Shircore.	Calcutta
S. Lobb, Esq.	Krishnagur
Col. J. F. Tennant, R. E.	Calcutta

BY DEATH.

The Hon'ble Sir D. F. McLeod, C. B., K. C. S. I.	Europe
C. Horne, Esq., C. S.	Europe
W. Abbey, Esq.	Rangoon
Dr. T. C. Jerdon.	Europe
Capt. A. B. Melville.	Europe
J. W. Laidlay, Esq.	Europe
Rev. J. Roberts.	Europe
Sir W. Denison, K. C. B.	Europe
Dr. T. Goldstücker, Corresponding Member.	Europe
Col. W. H. Sykes, F. R. S., Honorary Member.	London

ELECTIONS CANCELLED.

Nawáb Ziauddin Ahmad Khán Bahádur.	Delhi
Capt. A., J. Filgate, R. E.	Calcutta

[APPENDIX.]

ABSTRACT STATEMENT
OF
RECEIPTS AND DISBURSEMENTS
OF THE
ASIATIC SOCIETY OF BENGAL
FOR
THE YEAR 1872.

STATEMENT

Abstract of the Cash Account

RECEIPTS.

		1872.	1871.
ADMISSION FEES.			
Received from Members,	Rs. 768 0 0	768 0 0	1,472 0 0
SUBSCRIPTIONS.			
Received from Members,	... 7,551 0 0	7,551 0 0	7,044 7 0
PUBLICATIONS.			
Sale proceeds of Journal and Proceedings,	399 7 9		
Subscriptions to ditto, ...	854 12 0		
Refund of Postage Stamps,...	17 11 0		
Ditto of Freight, ...	3 6 0		
Ditto of packing charges, ...	1 4 0		
		1,276 8 9	1,729 8 3
LIBRARY.			
Sale proceeds of Books, ...	258 8 0		
Refund of Freight, ...	14 6 0		
Ditto of Postage Stamps, ...	4 4 0		
		277 2 0	371 3 3
SECRETARY'S OFFICE.			
Received Commission on purchase of Postage Stamps,...	... 11 3 0		
Saving of Salary, ...	... 5 8 0		
Received Fine, ...	... 3 0 0		
		19 11 0	32 7 10
VESTED FUND.			
Received Interest on the Government Securities from the Bank of Bengal, ...	110 0 0		
Less Income-Tax on ditto, ...	1 2 0		
		108 14 0	109 14 0
MISCELLANEOUS.			
O. P. Fund, ...	83 2 2		
The Government North Western Provinces, ...	13 8 0		
Syded Waliollah, ...	534 2 0		
Dr. J. Baxter, ...	0 6 0		
Babu Odaya Chanda Datta, ...	0 9 0		
Messrs. Williams and Norgate, ...	1 0 0		
M. Sashagiri Sastri, ...	12 0 0		
The Baptist Mission Press, ...	11 10 0		
F. S. Growse, Esq. ...	4 8 0		
Capt. G. E. Fryer, ...	7 12 0		
Dr. A. Neil, ...	0 2 10		
Dr. F. Stoliczka, ...	6 8 0		
The Rev. F. Mason, ...	3 12 0		
E. V. Westmacott, Esq. ...	34 15 0		
		718 10 0	
Carried over, Rs. 10,001, 8			

No. 1.

of the Asiatic Society for 1872.

DISBURSEMENTS.

PUBLICATIONS.		1872.	1871.
Paid Freight for sending Journal and Proceedings to Messrs. Williams and Norgate,	Rs. 40 6 0		
Ditto Lithographing & Engraving charges, ...	1,371 0 0		
Ditto Printing charges,	4,741 3 0		
Ditto Commission on Sale of Books, &c., ...	42 2 9		
Ditto Binding charges,	6 8 0		
Ditto Paper for Plates, &c.,	155 12 6		
Ditto Purchase of Postage Stamps,	234 5 2		
Ditto Price of two Plates from London, ...	81 15 0		
Ditto Freight and sending charges for ditto,	16 8 3		
Ditto Petty charges,	13 11 6		
		6,703 8 2	5,273 14 10

LIBRARY.

Paid Salary of the Librarian,	990 0 0		
Ditto Establishment,	120 0 0		
Ditto Commission on Sale of Books,	27 9 9		
Ditto Landing charges,	14 14 0		
Ditto Book binding,	9 8 0		
Ditto Subscription to the Medical Gazette, ...	15 0 0		
Ditto Salary of Punkhaman,	17 0 0		
Ditto Insufficient Postage,	1 7 0		
Ditto Subscription to the Indian Anti- quary,	20 0 0		
Ditto Subscription to the Calcutta Review, ...	16 0 0		
Ditto Purchase of Books,	93 0 0		
Petty charges,	19 13 6		
		1,344 4 3	2,540 14 9

SECRETARY'S OFFICE.

Paid General Establishment,	366 0 0		
Ditto Secretary's Office Establishment, ...	1,592 0 0		
Ditto Purchase of Postage Stamps,	97 7 10		
Ditto Ditto Stationery,	51 3 6		
Ditto Insufficient Postage,	2 12 0		
Ditto Meeting charges,	140 14 6		
Ditto Commission on Collecting Subscrip- tions,	42 3 0		
Ditto Salary of Mali,	57 0 0		
Ditto Subscription to the Army List,	30 0 0		
Ditto Ditto Directory,	14 0 0		
Ditto Printing charges,	62 6 3		
Ditto a Sheet Almanac,	1 0 0		

2,456 15 1.

Carried over, Rs. 8,057 12 5

	RECEIPTS.			1872.	1871.
	Brought over, Rs.	713	10	0 10,001	3 9
E. T. Atkinson, Esq.		8	1	9	
Capt. W. J. Williamson,		3	1	0	
A. Anderson, Esq.		2	13	0	
Dr. F. Day, ...		4	6	0	
L. Schwendler, Esq.		5	4	0	
The Hon'ble E. C. Bayley,		0	6	0	
G. Nevill, Esq.		1	8	0	
J. Wood-Masoh, Esq.		9	12	6	
		<hr/>		748	14 3

Carried over, Rs. 10,750 2 0

DISBURSEMENTS.				1872.	1871.
Brought over, Rs.				2,456 15 1	8,047 12 5
Ditto Advertising charges, ...	...	...	...	8 4 0	
Paid a Copy of Postal Guide, ...	...	...	...	1 8 0	
Ditto Fee to the Bank of Bengal for					
Stamping Blank Cheques, ...	...	...	...	1 9 0	
Ditto repairing a Clock, ...	...	...	...	21 0 0	
Ditto Ditto Case for ditto, ...	...	...	...	5 0 0	
Ditto Petty charges, ...	...	...	...	25 12 0	
				2,520 0 1	2,918 10 2

VESTED FUND.

Paid Commission to the Bank of Bengal					
for drawing interest on the Govern-					
ment Securities, ...				0 4 4	
					0 4 4

BUILDING.

Paid House rate, ...	...	...	432 0 0		
Ditto Police and Lighting rate, ...	...	...	198 0 0		
Ditto Water rate, ...	...	...	211 11 0		
Ditto Repairing charges, ...	...	...	11 12 3		
				853 7 3	877 3 2

COIN FUND.

Paid for Purchase of 29 Silver Bactrian					
Coins, ...				110 0 0	
Ditto Insufficient Postage on a parcel of					
Coins, ...	...	...	...	0 3 0	
Ditto Postage Stamps for returning a					
packet of Coins to England to the					
address of Mr. Foster, ...	...	...	...	25 6 0	
Ditto Tinman for shutting Tin Case					
for ditto, ...	...	...	...	0 2 0	
				135 11 0	0 0 0

MISCELLANEOUS.

Syed Wallioollah, ...	...	...	531 7 6		
Dr. J. F. N. Wisc, ...	...	...	0 12 0		
J. Wood-Mason, Esq. ...	...	...	6 9 0		
The Baptist Mission Press, ...	...	...	11 10 0		
Babu Pratapa Chandra Ghosha, ...	...	...	3 10 6		
Dr. F. Day, ...	...	...	4 6 0		
E. T. Atkinson, Esq., ...	...	...	6 11 9		
F. S. Growse, Esq., ...	...	...	1 8 0		
M. Sashagiri Sastri, ...	...	...	12 0 0		
E. V. Westmacott, Esq., ...	...	...	34 15 0		
J. Beames, Esq., ...	...	...	6 12 0		
E. C. Bayley, The Hon'ble, ...	...	...	0 6 0		
Col. J. C. Haughton, ...	...	...	0 7 0		
Capt. W. L. Samuells, ...	...	...	2 2 0		
Col. H. Hyde, ...	...	...	4 0 0		
A. M. Broadley, Esq. ...	...	...	4 0 0		
Capt. W. J. Williamson, ...	...	...	4 4 0		

635 8 9.

Carried over, Rs. 11,557 3 1

	RECEIPTS.	1872.	1871.
	Brought over, Rs.	10,750 2 0	
• BALANCE OF 1871.			
In the Bank of Bengal, ...	... 2,236 5 7		-
Cash in hand, ...	... 216 14 3		
	<u>2,453 9 10</u>		

Rs. 13,203 5 10

(Sd.) BUDDINATH BYSACK,
Cashier,
Asiatic Society Bengal.

(Sd.) LOUIS SCHWENDLER,
 (Sd.) F. W. PETERSON,
Auditors.

DISBURSEMENTS.				1872.	1871.
	Brought over, Rs.	635	8	911,557	3 1
O. P. Fund, ...	...	59	5	0	
The Government North Western Pro-	...				
vinces, ...	...	13	8	0	
A. M. Markham, Esq. ...	...	1	4	0	
J. G. Delmerick, Esq. ...	...	1	0	0	
L. Schwendler, Esq. ...	...	5	4	0	
The Rev. F. Mason, ...	...	3	12	0	
A. V. Nursing Rao, ...	...	0	4	0	
W. Stokes, Esq. ...	...	0	2	0	
A. Anderson, Esq. ...	...	11	15	6	
V. Richards, Esq. ...	...	2	11	0	
<hr/>				734	10 3
BALANCE.					
In the Bank of Bengal, ...	...	767	9	4	
Cash in hand, ...	...	143	5	2	
<hr/>				911	8 6

Rs. 13,203 5 10

(Sd.) BUDDINATH BYSACK,
Cashier,
Asiatic Society Bengal.

(Sd.) LOUIS SCHWENDLER,
 (Sd.) F. W. PETERSON,
Auditors. *

STATEMENT

Abstract of the Cash Account

RECEIPTS.

ORIENTAL PUBLICATIONS.	1872.	1871.
Received by Sale of Bibliotheca Indica, ... Rs.	2,502 11 8	
Ditto by Subscription to ditto, ...	20 0 0	
Ditto Refund of Postage and Packing charges, ...	47 9 0	
	2,570 4 8	2,581 1 0

GOVERNMENT ALLOWANCE.

Received from the General Treasury at 500 Rs.		
per month, ...	6,000 0 0	
Ditto ditto additional grant for the publication of Sanskrit works, at 250 Rs. per month, ...	3,000 0 0	
	9,000 0 0	9,000 0 0

Col. E. Dalton, Ethnology of Bengal, ...	44 7 0	
Asiatic Society of Bengal, ...	59 5 0	
J. R. Reid, Esq. ...	1 7 0	
P. Teromul Rao, ...	10 0 0	
Munshi Kapursing, ...	7 8 0	
Thakur Griprasad Singh, ...	100 0 0	
Dr. James Wise, ...	9 6 0	
Ram Kissen G. Bhauder Ker, ...	11 0 0	
Krishna Rao Hanmant, ...	100 7 0	
Babu Rutton Lal, ...	1 6 0	
Dr. G. Buhler, ...	20 0 0	
Kapurapa Vencataratum, ...	8 0 0	
Babu Kader Nath Ghosal, ...	10 0 0	
Pandita Sheonarain, ...	21 12 0	
Balbha Deb Siug, ...	2 0 0	
Babu Broj Bhushun Dosa, ...	6 4 6	
Jubanand Joshee, ...	0 14 0	
	416 12 6	

• CONSERVATION OF SANSKRIT MSS.

Received from the Accountt. General of Bengal, in part of the amount sanctioned towards the conservation of Sanscrit MSS. being the 2nd half of 1871-72, ...	1,550 0 0	
Ditto ditto the 1st half of 1872-73, ...	1,550 0 0	
Refund of the amount paid Babu Rajendra Lal Mitra, as advance for purchase of Sanscrit MSS. ...	400 0 0	
Sale proceeds of 13 Copies of Notices Sanscrit MSS. ...	13 0 0	
Refund by transfer to the O. P. Fund, being the amount paid to Premchand Chandhry, his salary for the month of April last, ...	30 0 0	
	3,543 0 0	1,844 0 0

Carried, over, Rs. 15,580 1 2

No. 2.

Oriental Publication Fund for 1872.

DISBURSEMENTS.

ORIENTAL PUBLICATIONS.		1872.	1871.
Paid Commission on Sale of Books,	Rs. 261 13 0		
Packing charges, ...	32 13 6		
Postage Stamps, ...	112 5 0		
Advertising charges,	400 0 0		
Freight, ...	147 0 0		
Bearing Postage, ...	0 2 0		
Commission on collecting Bill,	1 3 3		
Petty charges, ..	3 15 3		
		959 4 0	1,190 14 8
LIBRARY.			
Paid Purchase of 150 copies of Sanscrit MSS.	313 14 0		
Ditto as advance of Subscription Hindu Com- mittee, Vol. V., Nos. 1 to 12, ...	10 0 0		
		323 14 0	190 14 6
CUSTODY OF ORIENTAL WORKS.			
Paid Salary of the Librarian, ...	360 0 0		
Establishment, ...	574 0 0		
Stationery, ...	72 9 0		
Fee for Stamping Cheques, ...	3 2 0		
Book binding, ...	14 4 9		
Petty charges, ...	14 5 0		
		1,088 4 0	1,083 8 6
CATALOGUE OF SANSKRIT MSS.			
Paid Salary for Cataloguing Sanscrit MSS., at 30 Rs. per month, ...	360 0 0		
		360 0 0	360 0 0
MAASIR ALAMGIRI.			
Paid Printing charges, ...	445 0 0		
		445 0 0	550 0 0
FARHANG I RASHIDI.			
Paid Editing and Printing, ...	1,153 0 0		
		1,153 0 0	703 0 0
GOBILYA GRIHYA SUTRA.			
Paid Printing charges, ...	474 0 0		
		474 0 0	406 2 0
TANDYA MOHA BRAHMANA.			
Paid Editing and Printing charges,	656 6 0		
		656 6 0	1,312.12 0
SAMA VEDA.			
Paid Editing and Printing charges, ...	656 6 0		
		656 6 0	984 9 0
TAITTIRIYA PRATISAKHYA.			
Paid Editing and Printing charges, ...	593 9 0		
		593 9 0	328 8 0
MIMANSA DARSHANA.			
Paid Printing charges, ...	109 11 0		
		109 11 0	589 10 0
Carried over, Rs.		6,769 6 0	

RECEIPTS.	1872.	1871.
Brought over, Rs.	15,530 1 2	

Carried over, Rs. 15,530. 1 2

DISBURSEMENTS.			1872.	1871.
Brought over, Rs.			6,769 6 0	
TATTIRIYA SANHITA OF THE BLACK				
YAJUR VEDA.				
Paid Editing and Printing charges,	...	956 0 0	956 0 0	339 12 0
CHATURVARGA CHINTAMANI.				
Paid Editing and Printing charges,	...	1,312 12 0	1,312 12 0	656 6 0
ATHARVANA UPANISHAD.				
Paid Editing and Printing charges,	...	332 9 0	332 9 0	
GOPATHA BRAHMANA.				
Paid Editing and Printing charges,	...	562 2 0		
Ditto Banghy expense for sending MSS.	...	1 11 0	563 13 0	232 3 0
PINGULA CHHANDA SUTRA.				
Paid Printing charges,	...	232 3 0	232 3 0	
AKBAR NAMA.				
Paid Editing charges,	...	96 0 0	96 0 0	
TABAUAT f NASIRI.				
Paid Messrs. Gilbert Rivington, Printer, London, for Printing charges by a Bill of Exchange, £50-10-6, on the Cashier of Oriental Bank, London, at 1-10½, ...	...	533 0 0	533 0 0	
LATIYANA SRAUTA SUTRA.				
Banghy expenses for sending 2 Packets of ditto to Benares, ...	...	2 4 0	2 4 0	232 3 0
TATTIRIYA ARANYAKA.				
Paid Editing charges,	...	151 8 0	151 8 0	396 8 0
AIN I AKBARI.				
Paid for Purchase of Ain i Akbari,	...	45 8 0		
Editing charges, ...	...	192 0 0		
Printing charges, ...	...	703 0 0		
Preparing a Geographical Index 4500 Names to the Ain i Akbari, ...	...	80 0 0		
Postage and Registering Fee for,	...	1 1 3	1,021 9 0	1,120 8 0
POEMS OF CHAND.				
Paid Printing charges,	...	30 0 0		
Freight and Packing charges for sending Poems of Chand, ...	...	4 10 6	34 10 6	8 15 9
COPYING MSS.				
Paid copying charges,	...	57 9 0	57 9 0	198 5 0
Asiatic Society of Bengal, ...	...	83 2 2		
J. Woodburn, Esq. ...	...	5 4 6		
Pandita Chandrakanta Tarkalanker, ...	...	22 12 0		
Ram Krishna G. Bhanderka, ...	...	11 0 0		
Babu Broj Bhusun Doss, ...	...	43 10 0		
Krishna Rao Hanmant, ...	...	100 7 0		
			266 3 8	
Carried over, Rs. 13,068			3 6.	

RECEIPTS.		1872.	1871.
Brought over, Rs.		15,530	1 2
BALANCE OF 1871.			
In the Bank of Bengal, viz., Account-Current.			
Dr. J. Muir,	...	898	10 0
Ditto Conservation of Sanscrit MSS.,	...	2,849	0 11
Ditto Col. Dalton, Ethnology of Bengal,	...	2,450	12 0
Ditto O. P. Fund,	...	1,786	5 7
		<hr/>	<hr/>
		7,984	12 6
Cash in hand,	...	21	14 7
		<hr/>	<hr/>
		8,006	11 1

Rs. 23,586 12 3

(Sd.) BUDDINATH BYSACK,
Cashier.
Asiatic Society of Bengal.

(Sd.) LOUIS SCHWENDLER,
(Sd.) F. W. PETERSON,
Auditors.

DISBURSEMENTS. 1872. 1871.

	Brought over, Rs.	266	8	8	12,063	3	6
Thakur Griprasad Singh,	...	100	0	0			
Balvadeb Sing,	...	2	13	0			
Pandit Sheonarian,	...	3	8	9			
Dr. James Wise,	...	9	6	0			
Kapursing Munshi,	...	7	8	0			
Col. E. T. Dalton, Ethnology of Bengal,	...	2,520	5	0			
					2,909	12	5
CONSERVATION OF SANSKRIT MSS.							
Paid Salary for preparing Catalogue of Sanscrit MSS.,	...	360	0	0			
Ditto ditto for translating the Sanscrit Catalogue,	...	240	0	0			
Ditto Printing charges of Notice of Sanscrit MSS.,	...	1,198	12	0			
Ditto Postage for sending Notices of ditto ditto,	...	3	7	6			
•Ditto Freight for ditto ditto,	...	70	0	0			
Ditto Copying MSS.,	...	24	8	0			
Ditto Pasteboard, &c., for Pattas for binding Sanscrit MSS.,	...	18	9	6			
Ditto for Stationery,	...	13	5	0			
Ditto Printing 2,000 Copies of Blank Form,	...	65	0	0			
Ditto Purchase of Sanscrit MSS.,	...	365	13	0			
Ditto Banghy Expenses for sending MSS.,	...	1	11	0			
Ditto Packing charges,	...	22	6	0			
Ditto by transfer to the O. P. Fund, being the Salary of Premchandra Chaudhury, for the month of April last,	...	30	0	0			
Ditto Petty charges,	...	2	0	6			
					2,415	8	6
					17,388	8	5

BALANCE.

In the Bank of Bengal.

Dr. J. Muir,	...	898	10	0
Conservation of Sanscrit MSS.,	...	3,976	8	5
O. P. Fund,	...	1,262	8	9
		6,137	11	2
Cash in hand,		10	8	8

6,148 3 10

Ra. 23,536 12 3

(Sd.) BUDDINATH BYSACK,
Cashier.
Asiatic Society of Bengal.

(Sd.) LOUIS SCHWENDLER,
(Sd.) F. W. PETERSON,
Auditors.

Showing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st July. 1873.

LOUIS SCHWENDLER.
F. N. PETERSON.

Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st Jny. 1873.

LOUIS SCHWENDLER.
F. N. PETERSON.

Balance of 1871, ...	2,849	0	11
Received from the Government of Bengal, being the half sum sanctioned, annually Rs. 3,100, towards the conservation and publication of Sanscrit MSS. for the second half of 1871-72, ...	1,550	0	0
Ditto ditto for the 1st half 1872-73, ...	1,550	0	0
Refund of the amount paid Babu R. L. Mitra as advance for purchase of Sanscrit MSS. on the 9th October, 1871, ...	400	0	0
Refund by transfer to the O. P. F. the paid Prema Chandra Chandhury his salary for the month of April, last, ...	30	0	0
Sale proceeds of 13 copies of Notices of Sanscrit MSS., ...	13	0	0
			<u>6,392 0 11</u>

Rs. ...	<u>6,392 0 11</u>
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Dr.	
Amount spent in 1872, ...	2,415 8 6
Balance, ...	<u>3,976 8 5</u>
	6,392 0 11

Rs. ...	<u>6,392 0 11</u>
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LOUIS SCHWENDLER. F. N. PETERSON.

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1873.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical Elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.923	30.000	29.860	0.140	65.8	75.2	58.5	16.7
2	.922	29.992	.878	.114	66.5	77.5	58.0	19.5
3	.876	.931	.899	.125	66.6	78.0	57.5	20.5
4	.911	.973	.867	.111	67.3	79.0	58.2	20.8
5	.907	.991	.835	.156	69.1	79.8	59.4	20.4
6	.853	.917	.801	.116	71.5	83.6	61.5	22.1
7	.848	.903	.805	.098	73.4	84.0	66.5	17.5
8	.932	30.005	.857	.148	72.6	81.0	68.5	12.5
9	.988	.071	.941	.130	63.3	71.4	57.5	13.9
10	.952	.037	.886	.151	62.2	71.5	54.8	16.7
11	.980	.053	.922	.131	61.5	69.5	54.7	14.8
12	.996	.069	.934	.135	61.2	71.5	53.0	18.5
13	.994	.068	.924	.141	62.1	72.5	53.5	19.0
14	.976	.060	.920	.140	65.7	78.5	55.0	23.5
15	.923	29.983	.865	.118	69.5	80.3	62.8	17.5
16	.930	30.012	.857	.155	68.4	78.0	59.5	18.5
17	.902	29.981	.818	.133	68.4	78.7	60.0	18.7
18	.964	30.039	.905	.134	69.8	80.0	62.0	18.0
19	.990	.064	.942	.122	71.5	78.0	67.7	10.3
20	30.030	.091	.975	.116	69.9	77.5	64.0	13.5
21	.070	.160	30.018	.142	70.0	79.0	62.5	16.5
22	.075	.155	.010	.145	69.8	77.5	62.7	14.8
23	.066	.156	.002	.154	69.8	78.5	62.7	15.8
24	.033	.123	29.980	.163	70.1	78.5	63.2	15.3
25	29.950	.029	.884	.145	70.7	80.6	61.9	18.7
26	.918	29.998	.868	.130	71.2	80.5	65.4	15.1
27	.935	30.019	.868	.151	68.7	78.6	60.6	18.0
28	.963	.046	.907	.139	68.1	77.3	55.8	21.5
29	.987	.060	.937	.123	67.5	79.0	58.7	20.3
30	30.002	.081	.940	.141	67.9	79.0	58.0	21.0
31	.017	.101	.971	.130	70.2	82.0	60.0	22.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	60.7	5.1	56.6	9.2	0.467	5.18	1.86	0.74
2	60.9	5.6	56.4	10.1	.464	.14	2.05	.72
3	61.9	5.7	56.3	10.3	.462	.13	.08	.71
4	59.9	7.4	51.0	13.3	.428	4.73	.64	.64
5	62.6	6.5	57.4	11.7	.480	5.28	.50	.68
6	66.1	5.4	61.8	9.7	.555	6.09	.29	.73
7	68.5	4.9	64.6	8.8	.609	.66	.21	.75
8	68.8	3.8	65.8	6.8	.634	.94	1.72	.80
9	55.4	7.9	48.3	15.0	.352	3.93	2.58	.60
10	51.8	7.4	48.1	14.1	.350	.91	.38	.62
11	53.8	7.7	46.9	14.6	.336	.75	.41	.61
12	51.7	6.5	48.8	12.4	.358	4.01	.09	.66
13	56.1	6.0	50.7	11.4	.382	.28	1.99	.68
14	59.8	5.9	55.1	10.6	.444	.93	2.00	.70
15	63.6	5.9	58.9	10.6	.504	5.55	.33	.70
16	61.9	6.5	56.7	11.7	.469	.16	.46	.68
17	61.7	6.7	56.3	12.1	.462	.10	.52	.67
18	66.5	3.3	63.9	5.9	.595	6.55	1.40	.82
19	67.8	3.7	64.8	6.7	.613	.73	.65	.80
20	65.0	4.9	61.1	8.8	.543	5.97	2.01	.75
21	64.6	5.4	60.3	9.7	.528	.81	.19	.73
22	64.3	5.5	59.9	9.9	.521	.73	.22	.72
23	64.5	5.3	60.3	9.5	.528	.81	.14	.73
24	64.4	5.7	59.8	10.3	.520	.71	.32	.71
25	65.0	5.7	60.4	10.3	.530	.83	.65	.71
26	65.5	5.7	60.9	10.3	.539	.92	.38	.71
27	59.9	8.8	52.9	15.8	.412	4.55	3.14	.59
28	57.4	8.7	50.4	15.7	.379	.20	2.90	.59
29	59.1	8.4	52.4	15.1	.405	.48	.94	.60
30	60.2	7.7	54.0	13.9	.428	.72	.79	.63
31	68.1	7.1	57.4	12.8	.480	5.27	.78	.66

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.967	30.086	29.853	0.233	61.2	70.8	57.0	13.8
1	.956	.077	.836	.241	63.5	70.5	56.0	14.5
2	.946	.070	.826	.244	62.8	70.0	55.5	14.5
3	.936	.056	.817	.239	62.1	69.6	54.5	15.1
4	.932	.049	.811	.238	61.5	69.2	54.0	15.2
5	.942	.062	.815	.247	61.1	69.0	53.0	16.0
6	.955	.074	.836	.238	60.5	68.7	53.0	15.7
7	.975	.094	.858	.236	60.2	68.5	53.0	15.5
8	30.001	.124	.871	.253	62.0	69.7	55.0	14.7
9	.027	.150	.885	.265	65.0	70.5	59.5	11.0
10	.037	.160	.903	.257	69.5	73.5	62.7	10.8
11	.024	.153	.890	.263	72.3	77.4	65.0	12.4
Noon.	29.995	.125	.868	.257	74.6	80.6	67.0	13.6
1	.962	.082	.840	.242	76.2	82.4	68.6	13.8
2	.933	.050	.815	.235	77.3	83.7	69.0	14.7
3	.914	.037	.808	.229	77.8	84.0	69.5	14.5
4	.907	.029	.805	.224	76.6	82.5	68.0	14.5
5	.912	.030	.801	.229	75.2	81.0	66.8	14.2
6	.923	.041	.826	.215	72.0	77.6	64.5	13.1
7	.940	.062	.841	.221	70.1	75.5	62.5	13.0
8	.960	.072	.861	.211	68.5	73.5	61.2	12.3
9	.974	.083	.874	.209	67.1	72.4	59.5	12.9
10	.982	.098	.882	.216	66.0	71.5	58.5	13.0
11	.978	.092	.875	.217	65.2	71.0	58.0	13.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	60.8	3.4	57.7	6.5	.485	5.38	*1.31	0.80
1	60.3	3.2	57.4	6.1	.480	.35	.20	.82
2	59.8	3.0	57.1	5.7	.475	.30	.11	.83
3	59.3	2.8	56.8	5.3	.470	.26	.01	.84
4	58.8	2.7	56.4	5.1	.464	.19	0.97	.84
5	58.4	2.7	56.0	5.1	.458	.13	.95	.84
6	5.80	2.5	55.7	4.8	.453	.08	.89	.85
7	5.77°	2.5	55.4	4.8	.449	.03	.88	.85
8	58.9	3.1	55.1	5.9	.459	.14	1.11	.82
9	60.6	5.0	56.6	9.0	.467	.18	.82	.74
10	62.5	7.0	56.9	12.6	.472	.18	2.70	.66
11	63.2	9.1	55.9	16.4	.456	4.99	3.59	.58
Noon.	63.9	10.7	56.4	18.2	.464	5.05	4.15	.55
1	64.4	11.8	56.1	20.1	.459	4.99	.67	.52
2	64.9	12.4	56.2	21.1	.461	.99	.99	.59
3	65.0	12.8	56.0	21.8	.458	.95	5.18	.49
4	64.4	12.2	55.9	20.7	.456	.94	4.83	.51
5	64.7	10.5	57.3	17.9	.478	5.20	.17	.56
6	65.0	7.0	59.4	12.6	.513	.61	2.89	.66
7	64.2	5.9	59.5	10.6	.515	.65	.38	.70
8	63.5	5.0	59.5	9.0	.515	.68	1.97°	.74
9	62.6	4.5	59.0	8.1	.506	.60	.72	.77
10	62.1	3.9	59.0	7.0	.506	.61	.47	.79
11	61.5	3.7	58.5	6.7	.498	.52	.39	.80

All the Hygrometrical elements are computed by the Greenwich Constants.

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations.
taken at the Surveyor General's Office, Calcutta,
in the month of January 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	inches		lb	Miles	
1	130.0	...	N N E & W N W	...	74.8	B. Slightly foggy at midnight & 1 A. M., & from 7 to 10 P. M.
2	122.6	...	W N W & N W	...	50.5	B. Slightly foggy from 5 to 9 A. M., & 7 to 10 P. M.
3	127.5	...	S S E & N W	...	49.7	B. Slightly foggy at 6 & 7 A. M. & from 7 to 10 P. M.
4	124.9	...	N W & W N W	...	98.8	B. Slightly foggy from 7 to 9 P. M.
5	130.0	...	W by S & W N W	...	79.9	B to 2 P. M., & to 5 P. M. B to 11 P. M. Slightly foggy from 4 to 7 A. M., & 7 to 10 P. M.
6	135.2	...	W by S & S S W	...	65.4	B. Slightly foggy at 6 A. M., 7 to 8 P. M.
7	139.0	...	S S W & W N W	...	43.0	B. Slightly foggy from 6 to 8 A. M.
8	127.0	...	S by W & N N W	...	71.3	B to 8 A. M. S to 12 A. M. B to 11 P. M., Slightly foggy from 3 to 6 A. M.
9	129.0	...	N & N W	...	193.5	B. Slightly foggy at 7 & 8 P. M.
10	128.0	...	S E, ENE & N W	...	61.9	B. Slightly foggy from 7 to 11 P. M.
11	124.7	...	N N E & N N W	...	94.4	B. Slightly foggy from midnight to 3 A. M.
12	122.0	...	N E & N W	...	45.0	B. Slightly foggy from 7 to 11 P. M.
13	122.2	...	N N E & W by N	...	33.0	B. Slightly foggy from midnight to 3 at 6, 7 & 11 A. M., & from 7 to 9 P. M.
14	131.2	...	[Variable W by N, W &	...	30.0	B. Slightly foggy from 5 to 8 A. M.
15	133.0	...	S S W & W	...	143.8	B. Slightly foggy at 7 & 8 P. M.
16	128.5	...	N E & ENE	...	74.8	B. Slightly foggy at 10 & 11 P. M.
17	129.6	...	E N E & W by N	...	68.6	B. Slightly foggy at midnight & 1 A. M.
18	124.0	...	S & W by S	...	36.2	B to 4 A. M. S to 11 A. M., & to 4 P. M. B to 11 P. M., Foggy from 4 to 9 A. M.

\\i Cirri, \\i Strati, \\i Cumuli, \\i Cirro-strati, \\i Cumulo-strati, \\i Nimbi,
\\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND			General aspect of the Sky.
			Prevailing direction.	Max. force.	Velocity.	
		Inches.		lb	Miles.	
19	123.4		N N E & N E	...	51.3	B to 5 A. M. S to 11 A. M., \ i to 5 P. M. B to 11 P. M., Foggy from 3 to 10 A. M.
20	124.8		N E & E N E	...	120.1	\ i to 2 A. M., \ i to P. M. O to 7 P. M. B to 11 P. M.
21	128.0		E N E	...	94.8	B to 1 P. M., \ i to 6 P. M. B to 11 P. M.
22	125.0		E N E & E	...	81.8	B to 1 A. M., \ i to 8 A. M. B to 11 A. M., \ i & \ i to 5 P. M. B to 11 P. M.
23	130.0		S E & E by N	...	46.3	Chiefly B. Slightly foggy from 4 to 7 A. M. at 8 & 9 P. M.
24	131.0		E by N & N W	...	31.8	B. Slightly foggy from 5 to 7 A. M. & 8 to 10 P. M.
25	133.5		N E & N N W	...	33.2	B to 12 A. M., \ i & \ i to 6 P. M. B to 11 P. M. Slightly foggy at 8 P. M.
26	133.0		S E & N N W	...	41.7	B to 4 A. M. O to 9 A. M. B to 11 P. M., Foggy from 1 to 9 A. M. & 9 to 11 P. M.
27	133.8		N N E & N N W	...	78.1	B.
28	130.2		N N E & N N W	...	101.4	B.
29	131.2		N by W & N N W	...	108.3	B.
30	128.0		N N W & N W	...	101.4	B. Slightly foggy at 10 & 11 P. M.
31	133.0		N W & N E	...	33.2	B. Slightly foggy at 8 & 9 P. M.

\ i Cirri, — i Strati, \ i Cumuli, \ i Cirro-strati, \ i Cumulo-strati, \ i Nimbi, \ i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.962
Max. height of the Barometer occurred at 10 A. M. on the 21st ...	30.160
Min. height of the Barometer occurred at 5 P. M. on the 6th ...	29.801
Extreme range of the Barometer during the month	0.359
Mean of the daily Max. Pressures	30.038
Ditto ditto Min. ditto	29.903
Mean daily range of the Barometer during the month	0.135

	°
Mean Dry Bulb Thermometer for the month	68.0
Max. Temperature occurred at 3 P. M. on the 7th	84.0
Min. Temperature occurred at 5, 6 & 7 A. M. on the 12th	53.0
Extreme range of the Temperature during the month	31.0
Mean of the daily Max. Temperature	77.9
Ditto ditto Min. ditto,	60.1
Mean daily range of the Temperature during the month	17.8

Mean Wet Bulb Thermometer for the month	61.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.2
Computed Mean Dew-point for the month	56.8
Mean Dry Bulb Thermometer above computed mean Dew-point	11.2

	Inches.
Mean Elastic force of Vapour for the month	0.470

	Troy grain.
Mean Weight of Vapour for the month	5.19
Additional Weight of Vapour required for complete saturation ...	2.34
Mean degree of humidity for the month, complete saturation being unity	0.69

	°
Mean Max. Solar radiation Thermometer for the month	128.8

	Inches.
Rained No. day,—Max. fall of rain during 21 hours	Nil
Total amount of rain during the month	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	Nil
Prevailing direction of the Wind	N. W. & N. N. W.

* Height 70 feet 10 inches above ground.

MONTHLY RESULTS

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour when any particular wind was blowing it rained

[illegible]

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MARCH, 1873.

The Monthly General Meeting of the Society was held on Wednesday, the 5th instant, at 9 P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced.

1. From the Government of Bengal, a set of six Photographs of Antiquities of Dinájpúr, by J. H. Ravenshaw, Esq., C. S.

2. From the Chief Commissioner of Mysore, 2 lithographed copies of each of the following transcripts in Sanskrit of the Gauja Agrahar and Koppa Gadde Sásanas.*

अथत्याविष्कृतं विष्णोर्वाराहं चोभितार्णवं ।

दक्षिणोन्नतदंष्ट्रापे विश्रान्तं भुवनं वपुः ॥

इति समस्तभुवनाय श्रीशिवोन्नतम मन्त्राजिधिराज परमेश्वर परमभट्टारक इतिनापुर वराधीश्वर आद भगदत्तिपुरायकान्नादत्तवैरिवैधव्याण्डकुलकमलमार्त्ताण्डकदनप्रचण्ड- कलिङ्गकोदण्डगण्डमार्त्ताण्ड एकाङ्गवीररणरङ्गधीर अक्षपतिराय दिग्गपतिगजपतिरायसंहा- रकनरपतिरायमलकतलप्रदारिद्र्याकटप्रै।ठरेखारेवन्तसामन्तसगचामरकोङ्कणचातुर्दशभय- करनित्यकरपराङ्गपत्रमुवर्णवराहलाञ्छनध्वजसमस्तराजावलिविराजितसमालङ्कृत श्रीवैष्ण- वंशद्वयपारोक्षितचक्रवर्ति तस्य पुत्र जनमेजयचक्रवर्ति इतिनापुरे सुखसत्कथाविनोदन रात्र्यं करोति दक्षिणदिग्गजयथाचेयं विजयं करोति तुङ्गभद्राक्षरिद्रासङ्गमे श्रीहरिहर- देवमग्निधौ कटकमुकुलितचैत्रमासे कृष्णपक्षे अमावास्यां सोमवारे भरणीनक्षत्रे किङ्गकरसे उन्नतरायणसङ्क्रान्तौ अतीपातनिमित्ते सूर्यपर्वणि अर्धप्रामट्टहीतसमये सर्पयागं करोति अनवासे पंनिष्ठाहसमध्य खंपणसान्तिङ्गे साहसमूहं गौतमप्रामात् प्राञ्जलकण्डशाखेयं गौतमगोचदगेविन्दपट्टवर्द्धनम् । कण्डशाखेयवःश्रष्टगोचदवासनपट्टवर्द्धनम् कण्डशाखेय- भारद्वाजगोचदकेशवयज्ञदीक्षितम् कण्डशाखेयश्रीवत्सगोचदनारायणदीक्षितम् चतुर्मुख- नानागोचर्यो द्वाविंशत्साहसप्राञ्जलसर्पयागपूर्णाङ्किततदङ्कसमये मन्त्राङ्गप्रणवं करोति—

* See Proceedings for December, 1872, p. 193.

संहारकनरपतिरायमलकतस्तप्रहारिसामन्तस्यगजामरकोङ्कषातुर्दिसभयकरचपुटपात्र-
पुट ईररमुखकमलविनिर्गतसुधसालङ्कारमणिवीणादतरणसप्रविण कोरंटकस्यस्त्रिमाग्यु-
मादिमन्त्रवयसिद्वप्रसिद्धसमुद्यनमितपादारविन्दश्चरिरायकुलविलयकालानलमित्यकरप-
राङ्गनायुच सुवर्षवराहलाङ्कनध्वजसमसाराज्यावलिबिराजितसमालङ्कृत श्रीधामवंशोद्भ-
वपरिचितचक्रवर्ति तत्पुत्र जनमेजयचक्रवर्ति हलिनापुरे सुखसंकषाविनोदेन राशं
करोति द्विविजयं करोमि तुङ्गभद्राहरिद्रासङ्गमे श्रीहरिहरेश्वरसन्निधौ कटकमुकुलित-
चैवमासे छव्यपक्षे सोमवारे भरणीमहानक्षत्रे सङ्क्रान्तिव्यतिपातनिमित्ते सूर्ययागं करोमि
वनवासे पतीप्सश्चसमघासपण एद्रनाद्र एयतरतन्मध्ये पुंस्त्रगद्वेयग्रामप्राङ्गणकण्डवसाखेय
आत्रेयगोचद माधवपट्टवर्धनर कनडसाखेय वसिष्ठगोचदसङ्करवनिशर कनडसाखेयश्रीवत्स-
गोचदयोगेश्वरपट्टवर्धनर कनडसाखेयविश्वामित्रगोचदवीर्यदीक्षितर चउधमजनानागोच-
दसश्चद्वयप्राङ्गणं सूर्ययागपूर्णाङ्कनिसमर आसिर्वाद्पूर्वकं चक्रवर्तिमैत्रिपञ्चाङ्गपसायश्च-
सुखासनबलदग्दिगेष्मकदण्डण्डण अष्टतोगतैजसाम्य सर्वं नमस्य वागिपुत्रगोडेय ग्रामात्त-
न्मध्ये प्रविष्टवोम्नहल्लिनिदृष्टान्नेष्टेय कोरकोडी अष्टगंडेयकोडलीकेरेउरगण्डणकुलुवलो-
इडेयल्ली एवं दसग्रामात्तधारापूर्वकं दत्त तस्य ग्रामस्य सीमान्तराणि कर्षदसान्य-
दसीमे पुष्यगङ्गुयकान्नापुरदक्षिणैयचिसन्धिसीमेखोतसङ्गमतथादक्षिणमवलोकै पुष्यगंडेय
हारयदेसीमे खोतप्राय तथा दक्षिणपुष्यगंडेयहारय उदरेयचिसन्धिसीमे तवक तथा दक्षिण-
पुष्यगङ्गुय उदरेयदसीमेखोतप्रायदक्षिणग्रामप्राग्रेयपुष्यगंडेय उदरेयकदलीगेयनोतथा
तवक्रतथा पश्चिममवलोकै पुष्यगंडेयकदलिगेदिसिमेसचियकोलतथा पश्चिमपुष्यगंडेयकद-
ल्लियतवनिचियचिसन्धिसीमेबाल्लयकोल तथा पश्चिमपुष्यगंडेयतवनिधियदेसीमे एलवदकट्टु
तथा पश्चिमग्रामात्तुनिरवतिपुष्यगंडेयतवनिधीयतेङ्करचिसन्धिसीमे मोलेशुमोरडि तथा
उत्तरमवलोकै पुष्यगंडेयतेङ्करदेसीमेखायोवततेवक्रतथा उत्तरपुष्यगंडेयतेङ्करकुलगनचि-
सन्धिसीमे मागेर तथा उत्तरपुष्यगंडेयकुलगनदेसिमेउंयगंडे तथा उत्तरग्रामवायव्यपुष्य-
गंडेयकोलगनडासकरचिसन्धिसीमेखोत तथा पूर्वमवलोकै पुष्यगंडेयवसकरदेसिमेखोत-
प्राय तथा पूर्वपुष्यगंडेयवसकरताणगुप्येयचिसन्धिसीमेपाल्लगोल तथा पूर्वपुष्यगंडेयताण
गुप्येयदेसीमेखोतवक्र तथा पूर्वपुष्यगंडेयताणगुप्येयतिसन्धिसीमेखोत तथा पूर्वपुष्यगंडेय-
कान्नापुरदक्षिमेपूर्व तथानुसान्धिसीमे समान्नः ॥ ॥

सामान्योऽयं धर्मसेतुर्द्वयाणां काले काले पालनीये भवद्भिः ।

सर्वानेतान् भाविनः पार्थिवेन्द्रान् भूयो भूयो याचते रामभद्रः ॥

खदगां परदगां वा यो जरेत वस्तुभरां ।

वर्द्धिर्वैसज्जालि विद्यायां जायते त्रि(ऊ)भिः ॥

(ब्रह्मसं हि) विषं चोरं न विषं विषमुच्यते ।

विषमेकाकिनं हलि ब्रह्मसं पुत्रपौत्रकं ॥

श्रीरामनाथदेवभूमासचक्रम

3. From the Editor, A copy of Meghaduta with commentaries, edited by Bábú Pránanáth Pandit.

4. From the Director General of Geological Survey of England and Wales, A copy each of several earlier Memoirs of the Survey with maps, &c.

5. From the Chief Signal Officer, Washington, U. S. Three copies of the tri-daily Weather Bulletin.

6. From F. H. Pellow, Esq., C. S., specimens of wood and soil dug out near Baddibati, District Húgli.

The following letter accompanied the donation.

"I send you three specimens. 1st of wood cut from a prostrate stem of a tree found in a stratum about five feet below mean sea level—or at the level of low tide—and about 25 feet below the present surface of land at Baddibati; 2nd, of twigs found in the same stratum; and 3rd, of some consolidated earth at a little higher level—believed by some to be of vegetable origin, though I think it is only clay. These were found in excavations for the Húgli drainage works, which I visited this morning. The logs or prostrate stems are pretty numerous, the wood, as you will observe, is quite soft and is cut clean through with the spade; below the stratum is a soft greasy blue clay,—above are alternate strata of clay and sand. I have asked the engineer to look for littoral shells, which I looked for, but could not find. The prostrate trees look like trees stranded on a muddy beach of shore of a deltaic estuary. I have seen hundreds such near the mouths of the Sunderban khalls lying half buried in the same sort of mud.

The importance of the 'find' lies in the fact that it proves, so far as it goes, that the Delta has not sunk since the deposition of this stratum.

I would suppose that the land at Baddibati was then low estuary land with tidal creeks, such as the land east of Saugor Island is now, and that the Damúda and Ganges have since that period simply covered over this low land with strata of sand and clay at the same time pushing forward the shore. In other words that there has been nothing abnormal, no subsidence, at any rate.

This is contrary to the evidence afforded by other borings, but the question is whether the levels in the other cases were accurately taken. If they were, then the upright trees, &c. discovered far below the present sea level in those other cases, must be much more ancient than these—, or else there must have been partial subsidences confined to particular localities."

The President remarked on the interest attaching to all such notices of change of condition of surface, more especially when it was possible, as in this case, to determine the levels accurately. But he would advise much caution in attempting to apply conclusions derived from such very local changes in a great delta to the delta at large. Such appearances of elevation

or depression are often very deceptive, and require great care in their application.

6. From the Government of India, a set of 19 works on the East African dialects by Dr. Steere of the English Mission in Zanzibar.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected Ordinary Members—

A. Cappel, Esq.

G. W. Barclay, Esq.

A. J. Hughes, Esq., C. E.

Bábu Satyadayála Banerjia, B. L.

The following are candidates for ballot at the next meeting—

Frederick Jones, Esq., C. S., proposed by J. Wood-Mason, Esq., seconded by G. Nevill, Esq.

Edmund White, Esq., C. S., proposed by A. M. Markham, C. S., seconded by H. Blochmann, Esq., M. A.

Robert Turnbull, Esq., proposed by Bábu Rájendralála Mitra, seconded Col. A. S. Allan.

Babu Umesh Chunder Dutt, proposed by Col. A. S. Allan, seconded by Bábu Rájendralála Mitra.

T. T. Blissett, Esq., proposed by L. Schwendler, Esq., seconded by T. Oldham, Esq., LL. D.

J. W. Curtoys, Esq., has intimated his desire to withdraw from the Society.

The President reported on the part of the Council that the following gentlemen have been appointed to serve on the several Committees of the Society:—

FINANCE.

Bábu Rájendralála Mitra.

L. Schwendler, Esq.

Col. H. Hyde, R. E.

Col. A. S. Allan.

LIBRARY.

The Hon'ble J. B. Phear.

Bábu Rájendralála Mitra.

Col. H. Hyde, R. E.

Col. A. S. Allan.

W. L. Heeley, Esq., C. S.

J. Anderson, Esq., M. D.

J. Wood-Mason, Esq.

G. Nevill, Esq.

Dr. Mahendralal Sirkar.

L. Schwendler, Esq.

PHILOLOGY.

The Hon'ble E. C. Bayley, C. S. I.
 Bábu Rájendralála Mitra.
 W. L. Heeley, Esq., C. S.
 C. H. Tawney, Esq.
 Major General A. Cunningham, C. S. I.
 Rev. K. M. Banerjea.
 Bábu Gour Dass Bysack.
 Dr. Mahendralál Sirkar.
 Moulavi 'Abdul Latif Khan Bahádur.
 Moulavi Kabíruddin Ahmad Sáhíb.
 J. Beames, Esq.
 F. S. Growse, Esq.
 Babu Dvijendranáth Tagore.

NATURAL HISTORY.

J. Ewart, Esq., M. D.
 J. Anderson, Esq., M. D.
 W. S. Atkinson, Esq.
 J. Wood-Mason, Esq.
 G. Nevill, Esq.
 H. F. Blanford, Esq.
 W. T. Blanford, Esq.
 V. Ball, Esq.
 H. B. Medlicott, Esq.
 D. Waldie, Esq.
 G. E. Dobson, Esq., B. A., M. B.
 Dr. Mahendralál Sirkar.

PHYSICAL SCIENCE.

His Excellency Lord Napier of Magdala, G. C. B., G. C. S. I.
 Col. H. L. Thuillier, C. S. I.
 Col. H. Hyde, R. E.
 H. F. Blanford, Esq.
 D. Waldie, Esq.
 J. Wood-Mason, Esq.
 L. Schwendler, Esq.

COINS.

Hon'ble E. C. Bayley, C. S. I.
 Bábu Rájendralála Mitra.
 Major-General A. Cunningham, C. S. I.
 Major F. W. Stubbs.

Rev. M. A. Sherring.

J. G. Delmerick, Esq.

THE COMMITTEE OF PAPERS.

The Members of Council.

The President said that the letter he was about to read to the members of the Society would explain itself. They were aware that a claim submitted to the Government of India by the Council for rent of the house they occupied as a Museum, from the date at which Government had contracted to relieve the Society of these collections, had been for a long time under the consideration of Government. They would therefore hear the result with great satisfaction at finding that Government had assented to the claim of the Society in full.

No. 68.

*From J. GEOGHEGAN, Esq., Under Secretary to the Government of India,
Department of Agriculture, Revenue and Commerce.*

To the HONORARY SECRETARY to the Asiatic Society of Bengal.

Calcutta, dated 1st March, 1873.

(Industry, Science and Art.)

SIR,—With reference to your letter to the address of the Government of India in the Home Department, No. 47, dated the 29th January, 1872, on the subject of compensation for the loss of house accommodation consequent on delay in completing the new Museum building at Calcutta, I am directed to say that after full consideration of the circumstances of the case, His Excellency the Governor-General in Council is pleased to accede to the request of the Committee of the Asiatic Society, and to grant the Society a special allowance of Rs. 400 per mensem from the date fixed by law for the removal of the Museum collections, up to the date on which they may actually be removed.

I have the honor to be,

Sir,

Your most Obedient Servant,

J. GEOGHEGAN,

Under-Secretary to the Government of India.

Read a letter from F. S. Growse, Esq., M. A., C. S., on the proportion of the Muhammpadan and Hindú population of the village of Dotána near Mathurá.

‘On the high road between Delhi and Mathura, and about 22 miles from the latter city, is the village of Dotána, noticeable in this peculiarly Hindú part of the country for having as many as 715 Muhammadans, out of a total population of 1411. Scattered about in the fields by the road side are a number of Muhammadan buildings, mosques, tombs and dargáhs, which

though of no architectural beauty, are sure to attract the notice of the traveller. John de Laët in his "India Vera" (1631) refers to it though he wrongly calls it Akbarpur, which is the name of the next village—and says "This was formerly a considerable town ; now it is only visited by pilgrims who come on account of many holy Muhammadans buried here." Annual fairs are still held in honour of three of these holy men, by name Hasan Shahid, Sháh Nizám-ud-din and Pir Shakar-ganj, *alias* Báábá Farid.* The present zamindárs, who are in rather reduced circumstances, can tell me nothing about them and probably they were only local celebrities.'

The following papers were read—

- 1.—*Note on two Coins from Kāusāmbhi.*—By THE HON'BLE E. C. BAYLEY, C. S. I., C. S.

(Abstract.)

The Hon'ble E. C. Bayley explained to the meeting the legends of two ancient coins received by him from Kāusāmbhi, a ruined city in Alláhábád District. They appear to belong to the second century before Christ.

A wood-cut of the coins is in course of preparation.

- 2.—*The History of Pegu.*—By SIR ARTHUR P. PHAYRE, K. C. S. I., C. B.

(Abstract.)

This paper on the history of Pegu is chiefly derived from a MS. history, written in the Talaing language. It includes the early legends as to the building of the city of Tha-htun, called also Suvāna Bhumi, by colonists from ancient Kalinga or Talingāná. This was before the death of Gautama Budha, B. C. 545. Pegu was founded by emigrants from Tha-htun A. D. 573, and the present paper follows the history of that kingdom until the death of king Rídzádirit, in the year 1421 A. D.

The author also discusses the physical characteristics of the Taláings (a word derived of Talingāná) or Mon people, and the affinities between their language and that of the Munda Kols of Chutiá Nágpúr.

The reading of the following paper was postponed.

On the identification of certain Aboriginal Races noticed in Col. Dutton's Ethnology with those mentioned in Sanskrit works.—By BA'BU

RANGALÁL BANERJEE, Deputy Magistrate, Húgli.

The receipt of the following communications was announced—

1. New Burmese Plants, P. II., by S. Kurz, Esq.
2. On the Indian species of the genus *Thelyphonus*, by Dr. F. Stoliczka.
3. Notes on Malayan Amphibians and Reptiles, by Dr. F. Stoliczka.
4. The Initial coinage of Bengal, P. II., by E. Thomas Esq. F. R. S.

* Evidently 'jawábs' of the tombs of Hasan, son of 'Alí, Nizámuddín Auliá of Dihli, and Farid ud-din 'Attár of Pák Patán. THE EDITOR.

LIBRARY.

The following additions have been made to the Library since the last meeting held in February last.

* * * Names of Donors in capitals.

Presentations.

Bullétin de la Société de Géographie, Novembre, 1872.

Vivien de Saint Martin.—Essai sur les Castes dans l'Inde, par M. Esquer.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Journal Asiatique, Juin, Juillet, Août-Septembre, 1872.

M. Joseph Halévy.—Traduction des inscriptions Sabéennes, suivies de trois appendices.

M. J. Oppert.—Pasargades et Mourghab.—Interprétation d'une inscription d'Artaxerces II, Mnémon, trouvée à Suse. *M. G. Pothier*.—Étude de l'alphabet Cambodgien et manuel pratique de la langue Cambodgienne, par M. G. Janneau.

M. Francis Garraud.—Chronique royale du Cambodge. *M. Ch. Clermont-Ganneau*.—Résultats topographiques et archéologiques des fouilles entreprises à Jérusalem par le PALESTINE EXPLORATION FUND. *G. Garret*.—Ueber das Saptacathakam des Håla, Ein Beitrag zur Kenntniss des Pråkrit, von Albrecht Weber. *S. Guyard*.—Note sur le chapitre du FARIANG I SJEHANGIRI relatif à la daetylonomie.

THE ASIATIC SOCIETY OF PARIS.

Entomologische Zeitung, herausgegeben von dem Entomologischen Vereine zu Stettin, Jahrgang 1840-1872.

THE ENTOMOLOGICAL SOCIETY OF STETTIN.

Magnetische und Meteorologische Beobachtungen auf der K. K. Sternwarte zu Prag im Jahre, 1869-1871.

THE IMPERIAL OBSERVATORY OF PRAGUE.

Bollettino Meteorologico ed Astronomico del Regio Osservatorio dell Università di Torino, Anno 1872.

THE ROYAL ACADEMY OF SCIENCES OF TURIN.

Katalogos ton Arkaion Nomismaton, Tomos A'; Apologismos toy Ethnikoy Arkailogikoy Moyesioy.

THE NATIONAL LIBRARY OF ATHENS.

Ofversigt af Kongl. Vetenskaps—Akademiens Förhandlingar, 1869, 1870.

Kongliga Svenska Vetenskaps—Akademiens Handlingar, Bd. 7-8-9.

Lefnadsteckningar öfver Kongl. Svenska Vetenskaps Akademiens, Bd. I
Meteorologiska Jakttagelser i Sverige, 1867, 1868, 1869.

THE ROYAL ACADEMY OF STOCKHOLM.

The Journal of the Anthropological Institute, Vol. II, No. II.

J. Park Harrison.—On the artificial enlargement of the Ear-lobe. *A. W. Franks*.—Description of the Tattooed man from Burmah. *R. F. St Andrews St John*.—A

short Account of the Hill Tribes of North Aracan. *Commander H. S. St John*.—The Ainos: Aborigines of Yezo.

THE ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Journal of the American Oriental Society, Vol. X, No. 1.

Fitz-Edward Hall.—Thirteen inedited letters from Sir W. Jones to Sir C. Wilkins. *Rev. S. A. Rhea*.—Brief Grammar and Vocabulary of Kurdish Language of the Hakari District. *W. D. Whitney*.—Collation of a second manuscript of the Atharva-Veda-Pratīcākhyā. *Rev. A. Barker*.—On a Karen Inscription Plate.* *Rev. F. Mason*.—The Pali language from a Burmese point of view. *Rev. W. M. Thomson*.—Traces of Glacial Action on the flank of Mt. Lebanon. *Erica Abbot*.—On the Comparative Antiquity of the Sinaitic and Vatican Manuscripts of the Greek Bible.

THE AMERICAN ORIENTAL SOCIETY.

Journal of the Royal Geographical Society, Vol. 41.

G. W. Hayward.—Letters on his explorations in Gilgit and Yassin—*Captain S. Osborn*.—The Geography of the bed of the Atlantic and Indian Oceans and Mediterranean Sea. *Major T. G. Montgomerie*.—Report of the Mirza's Explorations from Cabul to Kashgar. *Capt. S. B. Miles and Werner Menzinger*.—Account of an Excursion into the Interior of Southern Arabia. *Capt. A. E. P. Harcourt*.—On the Himalayan Valleys—Kooloo, Lahoul and Spiti *Major E. B. Sledon*.—Exploration *vis à vis* the Irrawaddy and Bhamo to South-Western China. *Major General Abstanoff*.—The Principality of Karategin. *H. L. Jenkins*.—Notes on a trip across the Patkoi Rango. *W. Ellis*.—Results of the Observations taken by Mr. R. B. Shaw during his journey to Yarkand in 1870.

Proceedings of the Royal Geographical Society, Vol. XVI, Nos. 3 and 4.

No. 3.—*Dr. Crespigny*.—Northern Borneo. *Blakiston*.—Journey round the Island of Yezo. *Morpcu*.—Palladius' journey through Manchuria. *Ross*.—Journey through Meksran. *Loeffl*.—Survey of the Perso-Kelat Frontier. *Shaw*.—Position of Pein, Charchand Lob Nur &c. *Montgomerie*.—A Havildar's Journey from Chitral to Faizabad. *Lovett*. Route from Shiraz to Bam

No. 4.—Address at the Anniversary Meeting of the Royal Geographical Society, by Major General Sir H. C. Rawlinson, K. C. B.

Classified Catalogue of the Library of the Royal Geographical Society to December, 1870.

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Journal of the Chemical Society, August, Sept. and Oct. 1872.

J. A. Wanklyn.—New tests for some Organic fluids. *H. Deacon*.—On Deacon's Method of obtaining Chlorine as illustrating some principles of Chemical Dynamics.

THE CHEMICAL SOCIETY OF LONDON.

Transactions of the Zoological Society of London, Vol. VIII, part 2.

Arthur Viscount Wollen.—A list of the Birds known to inhabit the Island of Celebes, with an Appendix.

Catalogue of the Library of the Zoological Society.

Revised list of the Vertebrated Animals in the gardens of the Zoological Society of London, 1871.

THE ZOOLOGICAL SOCIETY OF LONDON.

* See also Proceedings for 1872, page 138.

Catalogue of Shield Reptiles in the British Museum, parts 1 and 2, by J. E. Gray.

Catalogue of the specimens of Hemiptera Heteroptera, part V, by F. Walker.

THE TRUSTEES OF THE BRITISH MUSEUM.

Memoirs of the Geological Survey of Great Britain and of the Museum of Economical Geology, London, Vols. I-IV. and June 1856-1870.

Geological Report on Londonderry and parts of Tyrone and Farnagh.

Reports on the Geology of Jamaica.

THE GEOLOGICAL SURVEY OF GREAT BRITAIN AND IRELAND.

Proceedings of the Institution of Mechanical Engineers, 1857-1869 and 1870-72.

THE INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

Les Religieuses Bouddhistes, par Mme. Mary Sumner.

THE AUTHOR.

Meghadutam, edited by Prānanāth Pandit.

THE EDITOR.

The Calcutta Journal of Science, Nos. 9 and 10.

THE EDITOR.

Grammar of the Sindhi Language by Dr. E. Triumph.

THE RT. HON'BLE THE SECRETARY OF STATE FOR INDIA.

Selections from the Records of Government, No. III.

THE GOVT. OF N. W. PROVINCES.

Anjili ya Bwana wetu na Mwokozi Isa Masiya kwa Mattayo (Gospel of St Matthew).

Katekisimo ya Kanisa Ingrezi (English Church Catechism).

Masoma ya Maandiko Matakatifu (Swaheli Scriptural Reading Lessons).

Zaburi za Daudi (Psalms of David).

Chuo cha Kuya endeleza Maneno za Kinuguja (Swaheli Spelling Book).

Sala za Subni na Jioni (Morning and Evening prayers).

Katekisimo Fupi (Short Catechisms).

Nymbo za Dini (From Ephrem Syrus).

Mashairi ya Kimasiliya.

Kitab u cha Ruth. (Book of Ruth.)

Kitabu cha Nabii Yona (Book of Prophet Jonah.)

Utenzi wa wokovu.

The First Sixteen Psalms translated into Swaheli.

Some account of the Town of Zanzibar by E. Steers.

Collections for the Nyamwezi Language by E. Steers.

Collections for a hand-book of the Shambala Language.

Collections for the Yao Language, by E. S. Steers.

Swaheli Tales, by E. Steere.

Hand-book of the Swaheli Language, by E. Steere.

THE GOVERNMENT OF INDIA.

Exchange.

The Athenæum for December 1872.

Nature, Nos. 166-168.

Purchase.

Revue Archéologique, Decr. 1872.

Comptes Rendus, Nos. 24, 25, 26.

No. 24.—*M. J. Moutier*.—Sur les effets thermiques de l'aimantation. *M. Th. Des Moncel*.—Sur les courants accidentels qui naissent au sein d'une ligne télégraphique dont un bout reste isolé dans l'air.

Nos. 25, 26.—*M. C. M. Garieł*.—Sur la distribution du Magnétisme dans les aimants. *M. Ch. V. Zenger*.—Nouvelle Note sur l'action des conducteurs disposés symétriquement autour d'un électroscope. *M. Renault*.—Sur une application nouvelle de la réduction des sels d'argent pour obtenir la reproduction de dessins.

American Journal of Science, No. 24, December, 1872.

L. M. Rutherford.—On the stability of the Collodion Film. *R. Gidgray*.—On the relation between colour and geographical distribution of Birds. *T. Leconte*.—A Theory of the formation of the great features of the Earth's surface.

PROCEEDINGS

ASIATIC SOCIETY OF BENGAL,

FOR APRIL, 1873.



A Meeting of the Society was held on Wednesday, the 2nd instant, at
9 P. M.

The Right Rev. the Lord Bishop of Calcutta in the chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced—

1. From the author, a copy of a printed paper entitled 'Additional Notes on the Raptorial Birds of North Western India,' by A. Anderson, Esq.
2. From the Government of India in the Home Department. A set of six photographs of Antiquities in Dinájpúr, taken by J. H. Ravenshaw, Esq., C. S.
3. From the Government of Bengal, a copy of a photograph of a pillar dug out at Bamnagar in Dinájpúr, taken by J. H. Ravenshaw, Esq., C. S.
4. From the Government of India, Home Department, copies of extracts from the Proceedings of the Chief Commissioner of British Burmah on the subject of Archaeological remains in that Province.
5. From the Surveyor-General of India, a copy of the General Report of the Topographical Surveys of India, 1871-72.

The following gentlemen duly proposed and seconded at the last meeting, were balloted for and elected Ordinary Members—

F. Jones, Esq., C. S.

E. White, Esq., C. S.

R. Turnbull, Esq.

Babu Umésh Chunder Dutt.

T. T. Blissett, Esq.

The following are candidates for ballot at the next meeting—

G. R. C. Williams, Esq., C. S., Muzaffarnagar, proposed by F. S. Growse, Esq., C. S., seconded by H. Blochmann, Esq., M. A.

H. B. Armstrong, Esq., Her Majesty's 1/14th Regiment, proposed by G. E. Dobson, Esq., M. A., M. B., seconded by Capt. J. Waterhouse.

W. Mackay, Esq., C. E., Port Blair, proposed by Dr. Stoliczka, seconded by V. Ball, Esq.

The Rev. John Hector, M. A., proposed by the Rev. W. Fyfe, M. A., seconded by D. Waldie, Esq.

The Rev. J. P. Ashton and Dr. C. F. Tonnerre have intimated their desire to withdraw from the Society.

Read a letter from Dr. Oldham informing the Council of the necessity he was under of resigning the office of President on account of his being obliged by ill-health to take sick-leave to Europe.

Also the following resolution passed by the Council on Dr. Oldham's resignation—

Resolved that the Council of the Asiatic Society record their sense of the obligations the Society is under to Dr. Oldham for the zeal and ability with which he has discharged the office of President as well as for his unremitting exertions to promote the objects and interest of the Society during the long period of his membership since 1851, and express their deep regret at the cause which now compels him to resign the office of President. They also earnestly hope that he may be able to return to India with renewed health and strength, and resume his place among them once more.

Colonel Thuillier on behalf of the Council begged to bring to the notice of the meeting the severe loss the Society was sustaining by the resignation of their esteemed President, Dr. Oldham. He felt certain that he was expressing the opinion of the Society at large, when he regretted the departure of their President, and more especially owing to the cause which necessitated his leaving India. He thought the Society was deeply indebted to Dr. Oldham not only for his valuable services as President of the Society, but for many years of earnest labour in the cause of Science which was brought to bear on the interests of the Asiatic Society. He wished they might see Dr. Oldham back again with renewed health and vigour, when they might again have the great benefit of his services.

The Council reported that consequent on Dr. Oldham's resignation, they had elected Col. H. Hyde, R. E., President of the Society, and Dr. S. B. Partridge a member of Council, subject to confirmation by the meeting.

The proposed elections were carried unanimously.

They also reported that they had appointed Mr. W. McLaren Smith, M. A., a member of the Library and Physical Science Committees.

The following papers were read—

I. *The History of Pegu* (continued).—By Major General SIR ARTHUR P. PHAYRE, K. C. S. I., C. B.

(Abstract.)

This paper is a continuation of the 'History of Pegu' read at the last meeting. It commences with the history of Rádzádirit's successors (end of

the fourteenth century) to Taká-rwutbi who, in 1540, was deposed by Tabeng Shwéhti, king of Táungu. The article also contains comprehensive and interesting notes on the early European travellers that visited Burmah, and an account of the dealings of the Portuguese.

II. *Studies in the grammar of Chand Bardai.*—By JOHN BEAMES, Esq., B. C. S.

(Abstract.)

Mr. Beames having published the first fasciculus of his text edition of this ancient poet, has collected in this paper the grammatical peculiarities which Chand's language exhibits. The illustrations are chiefly taken from the 1st, 19th, 64th, and 65th books.

In the preface, Mr. Beames remarks on the MSS. which he has consulted. Historically, he says, the Baidlah MS., of which the Asiatic Society has a copy, has the best right to be considered the representative of the original text. Tod's and Caulfield's MSS., belonging to the Royal Asiatic Society, were made for the officers whose names they bear in the second decade of the present century. The Bodleian has no colophon, but agrees with Tod's. The Agrah MS. is the worst, and is most carelessly written of all. As Caulfield's MS. and the Bodleian are locked up in English libraries, they cannot be used; and Mr. Beames and Dr. Hoernle take Tod's MS. as the basis of their text edition.

Mr. Blochmann said—

At the January meeting of the Society, I exhibited Arabic and Persian inscriptions from various places in Bengal, received from General Cunningham, Mr. W. L. Heeley, Mr. E. V. Westmacott, Dr. J. Wise, and Mr. Walter M. Bourke, and shewed the importance of mural evidence for the elucidation of Bengal history. I have since examined our collection of coins, in order to procure additional testimony, and have found several coins of great value. These coins are now in the hands of an artist; and a plate of such as are new, will be issued together with my paper on the inscriptions.

The coins are—

- (1). Four specimens of 'Iwaz coins, as lately published by Mr. E. Thomas in his Second Part of the 'Initial Coinage of Bengal.'
- (2). Three silver coins of Shihábuddín Abul Muzaffar Báyzázid Sháh, of A. H. 812, and 816. Is this the Dínájpur Rájah Ganesh (Kanish) ?
- (3). Three silver coins of Jaláluddín Abul Muzaffar Muhammad Sháh, of A. H. 818 and 821.
- (4). One BárbakSháhi, different from the one published by Marsden.
- (5). One FathSháhi, of A. H. 886—shewing the same date as Dr. Wise's inscription of that king. *Mint town, Fathábád.*

(6). Three NuçratSháhís, of A. H. 922 and 927. These coins were struck by Nuçrat Sháh during the lifetime of his father, which probably points to a successful rebellion. The mint town is Khalífatábád, or Haveli, in Southern Jasar District, on the northern edge of the Sundarban, near Bágherghát. I have identified this town with the hitherto unknown *Cuipitavaz* on De Barros' Map, one of the "lost towns" of the Sundarban.

(7). One coin of Fírúz Sháh (III), son of Nuçrat Sháh, of A. H. 939.

Mint town Husainábád.

In connexion with these additions to our knowledge, I may also state that the Society has since January received the following inscriptions, which will be immediately published.

1. *From Mr. J. G. Delmerick, Delhi.*

One Balban Inscription from Sonpat, A. H. 670.

Two Ibráhím Lodí Inscriptions, from the same place, of A. H. 928, and 930.

A most interesting inscription in Sanskrit, of Samwat 1384, from Hariyana, which has been translated by Bábu Rájendrakála Mitra.

2. *From Bábu Ganga Parsád, Muráddábád.*

One Bábar Inscription, of A. H. 933, from Sambhal.

One Akbar Inscription, of A. H. 980, from Amrohah.

One Sháhjahán Inscription, of A. H. 1051, from Amrohah.

One Shahjahán Inscription, of A. H. 1067, from Sambhal.

3. *From Dr. J. Wise, Dháká.*

A collection of Inscriptions from Sháh Jalál's tomb at Silhaṭ. The oldest are a Yúsuf Sháhí and a Husain Sháhí; the most recent belong to Aurangzib's reign. Dr. Wise has also sent an interesting note on this legendary saint and conqueror of Silhaṭ.

Also, an inscription from 'Azímnagar, Dháká District.

4. *From Mr. Walter Mr. Bourke.*

Five inscriptions from Rájmahall.

The receipt of the following communications was announced —

1. Notes, translation and reading of a set of three copper plate inscriptions found at Sambalpúr. By Bábu Pratápachandra Ghoshla.

2. On the History of Pegu, No. II.—By Major General Sir A. P. Phayre, K. C. S. I., C. B.

3. Studies in the grammar of Chand Bardai—By John Beames, Esq., C.S.

4. On the genera *Muringa* and *Harpyiocephalus* of Gray. By G. E. Dobson, B. A., M. B.

LIBRARY.

The following additions have been made to the Library since the Meeting held in March last.

Presentations.

* * * Names of Donors in Capitals.

Monatsbericht, September and October, 1872.

Peters.—Über den *Vespertilio calcaratus*, Prinz zu Wied, und eine neue Gattung der Flederthiere, *Tylonycteris*. *Hildebrand.*—Über die Bestäubungs-verhältnisse bei den Gramineen.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Bulletin, Decembre, 1872.

Examen comparatif du tracé des routes proposées pour unir l'Europe et les Indes par le sud du Caucase.

Janvier, 1873.

Dr. Martin.—L'extrême Orient. *Clermont Ganneau.*—Découverte de la ville royale Chananienne de Gezer.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Proceedings, 30th June and 31st July, 1872, parts 1 and 2.

Mr. R. H. Tweedell.—On the application of water pressure to shop tools and Mechanical Engineering works. *Mr. W. Proctor Baker.*—On the Buchholz process of decorating grain and making Semolina and flour by means of fluted metal rollers.

THE INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

A Manual of Diseases of the Eye, by Dr. C. Macnamara.

THE AUTHOR.

A Treatise on Asiatic Cholera, by Dr. C. Macnamara.

THE AUTHOR.

Kumara Sambhava, in Bengali rhymes, by Babu Ranga Lal Banerji.

THE AUTHOR.

Additional Notes on the Raptorial Birds of North Western India, by A. Anderson.

THE AUTHOR.

The Christian Spectator, Vol. II, Nos. 21 and 22.

THE EDITOR.

The Calcutta Journal of Medicine, Nos. 11 and 12.

THE EDITOR.

Professional Papers on Indian Engineering, Vol. II, No. 7.

H. Bell.—Graphic Time Table. *P. Dejour.*—Margohi cement. *C. Fouracres.*—Hydraulic Brake and Tumbler Shutters. *Major A. M. Lang.*—Eastern Ganges Canal. *Major H. Tulloch.*—Masonry versus Earthen Dams. *Capt. E. V. Twemlow.*—Experiments on Selenitic Mortar.

THE EDITOR.

The Rámáyana, Vol. 3, No. 5.

THE EDITOR.

The Annals of Indian Administration, 1870-71, Vol. XV. part 2, and Vol. XVI, parts 1 and 2:—

Report on the Administration of the N. W. Provinces for 1871-72.—

Annual Report on the Insane Asylums in Bengal in 1871.—

Report on the Excise Administration in the Lower Provinces for 1871-72.

Report on the Sanitary Administration of the Panjáb for 1871.

Statistics of the Crime of Dacoity.

THE GOVERNMENT OF BENGAL.

General Report on the Topographical Surveys of India for 1871-72.

THE SURVEYOR GENERAL OF INDIA.

Results of a Tour in Dárdistán, &c. Vol. I., No. III.

THE GOVERNMENT OF THE PANJÁB.

Purchase.

Pratnakanira Nandini. Vol. V, No. 8.

The Indian Antiquary, March, 1873.

Capt J. S. F. Mackenzie—The Kulwadi of the Hassan district. *J. Beames*.—On the Sub-Divisions of the Bráhman casto in Northern Orissa. *Professor Ramkrishna Gopal Phandarkar*.—Putanjali's Mahabháshya. *Kashinath Trimbak Telang*.—The date of Sri Harsha. *E. Reclus*.—An Embassy to Khatá or China, A. D. 1419. *Capt. R. Cole*.—Cromlechs in Maisur

Exchange.

- Nature, Nos. 170-74.

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1873.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height of the Barometer at 32° F alt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.994	30.082	29.940	0.142	71.4	82.4	61.5	20.9
2	30.036	.114	.957	.157	70.1	78.7	61.5	14.2
3	.106	.194	30.049	.145	68.7	78.5	60.0	18.5
4	.012	.112	29.965	.116	66.3	74.6	59.5	15.1
5	29.972	.060	.891	.169	67.7	79.4	57.9	21.5
6	.975	.065	.916	.119	69.1	80.8	59.0	21.8
7	.982	.057	.939	.118	70.7	82.0	60.1	21.6
8	.993	.072	.953	.119	72.8	81.0	63.0	21.0
9	.918	.018	.881	.134	75.2	86.5	65.2	21.3
10	.972	.061	.927	.134	74.8	84.3	67.5	16.8
11	.969	.039	.908	.131	73.1	84.3	63.0	21.3
12	30.005	.102	.945	.157	71.8	83.0	62.6	20.4
13	29.998	.092	.935	.157	69.6	81.5	59.5	22.0
14	.982	.057	.928	.129	69.9	82.2	58.5	23.7
15	.976	.067	.911	.156	70.9	83.2	59.8	23.4
16	.935	.011	.869	.112	71.8	81.4	60.5	23.9
17	.945	.011	.890	.121	73.5	86.5	63.0	23.5
18	.995	.070	.940	.130	75.5	86.7	66.0	20.7
19	30.022	.111	.954	.157	75.7	87.7	65.5	22.2
20	29.956	.017	.868	.179	76.6	89.0	66.5	22.5
21	.853	29.923	.783	.140	77.3	88.0	68.0	20.0
22	.869	.958	.810	.148	78.2	88.3	69.5	18.8
23	.805	.883	.722	.161	79.7	90.6	73.3	17.3
24	.745	.807	.686	.121	79.3	91.3	69.0	22.3
25	.767	.846	.719	.127	80.6	92.5	72.0	20.5
26	.772	.852	.723	.129	80.4	92.4	71.7	20.7
27	.761	.837	.697	.140	81.3	93.5	73.0	20.5
28	.808	.904	.718	.186	77.6	86.7	69.0	17.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew	E.	Wet Bulb in a Cup	Wet Bulb in air.	Wet Bulb in air.	Wet Bulb in air.
					Inches.	T. gr.	T. gr.	T. gr.	T. gr.
1	63.9		57.9	13.5	0.488	5.34	3.01	0.64	
2	62.4	8.0	56.0	14.4	.458	.03	.07	.62	
3	60.3	8.4	53.6	15.1	.422	4.66	.03	.61	
4	59.8	8.4	54.7	11.5	.438	.85	2.27	.68	
5	60.2	7.5	54.2	13.5	.431	.75	.71	.64	
6	61.6	7.8	55.4	14.0	.449	.94	.92	.63	
7	61.3	6.4	59.2	11.5	.509	5.59	.59	.68	
8	66.5	6.3	61.5	11.3	.550	6.02	.69	.69	
9	68.9	6.3	61.5	10.7	.607	.61	.76	.71	
10	65.8	9.0	59.5	15.3	.515	5.61	3.65	.61	
11	63.4	9.7	55.6	17.5	.452	4.94	.85	.56	
12	61.0	10.8	52.4	19.4	.405	.44	4.01	.53	
13	59.9	9.7	52.1	17.5	.401	.42	3.48	.56	
14	59.9	10.0	51.9	18.0	.398	.39	.59	.55	
15	60.9	10.0	52.9	18.0	.412	.53	.70	.55	
16	62.1	9.7	51.3	17.5	.432	.73	.72	.56	
17	66.9	6.6	62.3	11.2	.565	6.17	2.73	.69	
18	67.6	7.9	62.1	13.4	.561	.11	3.35	.65	
19	67.4	8.3	61.6	14.1	.552	.00	.51	.63	
20	67.7	8.9	61.5	15.1	.550	5.98	.79	.61	
21	69.0	8.3	63.2	4.1	.582	6.31	.67	.63	
22	70.7	7.5	65.4	2.8	.626	.77	.48	.66	
23	72.4	7.3	67.3	2.4	.666	7.19	.53	.67	
24	70.5	8.8	64.3	5.0	.603	6.52	4.67	.62	
25	74.6	6.0	70.4	10.2	.736	7.94	3.07	.72	
26	73.2	7.2	68.2	2.2	.686	.40	.54	.68	
27	72.8	8.5	66.8	4.5	.655	.04	4.20	.63	
28	64.9	12.7	56.0	21.6	.458	4.95	5.12	.49	

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night	29.935	30.107	29.738	0.369	69.3	77.5	62.2	15.3
1	.927	.101	.729	.372	68.6	76.5	61.5	15.0
2	.918	.099	.723	.367	67.8	75.6	60.5	15.1
3	.908	.078	.718	.360	67.2	75.0	60.0	15.0
4	.907	.074	.723	.351	66.5	74.7	59.5	15.2
5	.921	.084	.730	.354	65.8	74.2	59.0	15.2
6	.910	.102	.735	.367	65.2	73.5	58.5	15.0
7	.957	.125	.751	.374	64.7	73.7	57.9	15.8
8	.981	.159	.783	.376	67.0	75.0	60.5	14.5
9	30.006	.183	.801	.382	71.4	79.0	64.4	14.6
10	.015	.194	.807	.387	75.7	83.0	66.4	16.6
11	.004	.182	.798	.384	78.9	86.8	67.5	19.3
Noon.	29.975	.147	.770	.377	81.5	89.4	69.0	20.4
1	.944	.119	.737	.382	83.2	92.0	71.3	20.7
2	.913	.085	.708	.377	81.4	93.2	73.3	19.9
3	.892	.067	.696	.371	85.0	93.5	74.0	19.5
4	.881	.057	.686	.371	84.6	92.1	74.6	17.8
5	.881	.049	.686	.363	83.3	90.0	74.0	16.0
6	.890	.057	.688	.369	79.7	86.4	70.5	15.9
7	.902	.076	.714	.362	76.3	82.7	69.0	13.7
8	.921	.097	.740	.357	74.3	80.4	67.0	13.4
9	.935	.107	.757	.350	72.4	79.0	65.5	13.5
10	.942	.110	.763	.347	71.3	78.5	64.0	14.5
11	.987	.114	.747	.367	70.3	78.4	63.0	15.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1873.*

Hourly Means, &c of the Observations and of the Hygrometrical elements
dependent thereon — (Continued).

Hour	Mean Wet Bulb Ther- mometer	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point	Mean Elastic force of Vapour	Mean Weight of Vapour in a Cubic foot of air.	Additiona Weight of Vapour required for complete saturation	Mean degree of Humi- dity computed by satura- tion being unity.
	°	°	°	°	Inches	T gr	T gr	
Mid- night	65.1	4.2	61.7	7.6	0.551	6.09	1.71	0.78
1	61.5	1.1	61.2	7.1	.511	.01	.66	.78
2	64.0	3.8	61.0	6.8	.511	5.98	.50	.80
3	63.6	3.6	60.7	6.5	.536	.92	.13	.81
4	63.1	3.1	60.4	6.1	.530	.88	.31	.82
5	62.6	3.2	60.0	5.8	.523	.80	.21	.82
6	62.0	3.2	59.1	5.8	.513	.69	.22	.82
7	61.7	3.0	59.3	5.1	.511	.68	.12	.84
8	63.0	1.0	59.8	7.2	.520	.75	.55	.79
9	61.7	6.7	59.3	12.1	.511	.60	2.75	.67
10	66.1	9.6	59.4	16.3	.512	.58	2.93	.59
11	66.8	12.1	58.3	20.6	.491	.33	5.11	.51
• Noon	67.1	11.1	57.0	21.5	.473	.08	6.23	.45
1	67.5	15.7	56.5	26.7	.465	1.98	.91	.42
2	67.9	16.5	56.3	28.1	.462	.91	7.37	.40
3	68.0	17.0	56.1	28.9	.459	.90	.63	.39
4	67.8	16.8	56.0	28.6	.458	.88	.51	.39
5	68.3	15.0	57.8	25.5	.486	5.20	6.73	.44
6	68.9	10.8	61.3	14.1	.516	.90	4.82	.55
7	68.0	8.3	62.2	11.1	.563	6.11	3.58	.63
8	67.2	7.1	62.2	12.1	.563	.11	2.94	.67
9	66.3	6.1	61.4	11.0	.518	.60	.60	.70
10	66.1	5.2	61.9	9.1	.557	.12	.21	.74
• 11	65.8	4.5	62.2	8.1	.563	.19	1.89	.77

All the Hygrometrical elements are computed by the Greenwich Constants.

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1873.*

Solar Radiation. Weather, &c.

D.	Max Soli radiation	Rain Gauge 1½ ft. above Ground.	WIND.		Miles	General aspect of the Sky.
			Prevailing direction.	Force by velocity		
1	131.0	...	N E & N W	...	76.0	B.
2	131.2	...	N W & N E	...	98.2	B to 6 A. M. \i to 10 A. M., B to 11 P. M. Slightly foggy from 8 to 10 P. M.
3	130.8	...	N E	...	126.5	B. to 2 P. M. \i to 6 P. M. B to 11 P. M.,
4	125.0	...	N E & W by N	...	121.5	\i & \i to 1 A. M. B to 4 A. M. \i to 9 A. M. S to 3 P. M. \i to 6 P. M. B to 11 P. M.
5	135.0	...	W N W & N W	...	60.2	B. Slightly foggy from 7 to 9 P. M.
6	133.3	...	N W	...	41.4	B. Slightly foggy at 7 & 8 A. M. & 8 & 9 P. M.
7	138.0	...	W & W N W	...	34.5	B. Slightly foggy from 5 to 7 A. M.
8	138.0	...	W N W & W by N	...	26.5	B. Slightly foggy at 5 & 6 A. M.
9	141.0	...	W S W & S S W	...	50.8	B to 2 P. M. \i to 5 P. M. B to 11 P. M. Slightly foggy from 4 to 7 A. M.
10	135.0	...	N & N by W	...	102.6	B. Slightly foggy from 8 to 11 P. M.
11	139.0	...	N N E & N W	...	75.6	B. Slightly foggy at midnight & 1 A. M., & from 8 to 10 P. M.
12	136.5	...	N N E & N E	0.2	101.4	B Foggy from 8 to 11 P. M.
13	138.7	...	N E & N W	0.2	90.6	B Foggy from midnight to 6 A. M.
14	135.0	...	N W	...	102.9	B Slightly foggy at 9 & 10 P. M.
15	135.0	...	N W & E N E	...	102.0	B.
16	140.5	...	W N W & N N W	...	79.0	B. Slightly foggy at 8 P. M.
17	142.5	...	W by S & S S W	...	74.0	B to 3 P. M. \i to 7 P. M. B to 11 P. M. Foggy from 5 to 9 A. M.
18	144.0	...	S S W	...	84.5	B to 8 A. M. \i to 6 P. M. B to 11 P. M. Foggy from 4 to 7 A. M.
19	142.0	...	W S W & N W	...	79.9	Chiefly \i.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inch.		lb	Mile.	
20	141.5		S S W	...	80.5	¶i to 3 P. M. B to 11 P. M.
21	142.8		W by S	...	115.3	B to 8 A. M., ¶i to 11 A. M.
22	141.0		W & S S W	...	56.8	¶i to 8 P. M. B to 11 P. M.
23	142.2		S S W & S	...	107.6	B to 1 A. M. ¶i to 7 A. M. B to 11 P. M.
24	145.0		W by N & W by S	...	119.2	B to 2 A. M. ¶i to 4 A. M. S to 9 A. M. B to 11 P. M. Foggy at 6 A. M.
25	144.0		S	...	102.7	B. Slightly foggy from 3 to 7 A. M.
26	145.0		S, S W & S S W	0.8	183.5	B to 4 A. M. S to 6 A. M. B to 2 P. M. ¶i to 4 P. M. B to 11 P. M.
27	141.5		S W & S by W	0.8	252.2	B.
28	138.0		N by W & W by N	...	199.7	B.

¶i Cirri, —i Strati, ¶i Cumuli, ¶i Cirro-strati, ¶i Cumulo-strati, ¶i Nimbi,
¶i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.935
Max. height of the Barometer occurred at 10 A. M. on the 3rd ...	30.194
Min. height of the Barometer occurred at 4 & 5 P. M. on the 24th ...	29.686
<i>Extreme range</i> of the Barometer during the month	0.508
Mean of the daily Max. Pressures	30.016
Ditto ditto Min. ditto	29.872
<i>Mean daily range</i> of the Barometer during the month	0.144

	°
Mean Dry Bulb Thermometer for the month	73.9
Max. Temperature occurred at 3 P. M. on the 27th	93.5
Min. Temperature occurred at 7 A. M. on the 25th	57.9
<i>Extreme range</i> of the Temperature during the month	35.6
Mean of the daily Max. Temperature	85.1
Ditto ditto Min. ditto,	64.6
<i>Mean daily range</i> of the Temperature during the month	20.5

Mean Wet Bulb Thermometer for the month	65.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer .	8.2
Computed Mean Dew-point for the month	60.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	13.9

	Inches.
Mean Elastic force of Vapour for the month	0.523

	Troy grain.
Mean Weight of Vapour for the month	5.71
Additional Weight of Vapour required for complete saturation ...	3.30
Mean degree of humidity for the month, complete saturation being unity	0.64

	°
Mean Max. Solar radiation Thermometer for the month	138.4

	Inches.
Rained No. day,—Max. fall of rain during 24 hours	Nil
Total amount of rain during the month	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	Nil
Prevailing direction of the Wind	N. W. & N. E.

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1873.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Time of day.	Range of the Barometer during the day.				Range of the Temperature during the day.		
		Max.	Min.	Diff.	Mean.	Max.	Min.	Diff.
	Mean.							
	Inches.	Inches.	Inches.	Inches.	°	°		
1	29.873	29.959	29.830	0.129	71.8	86.4	61.8	21.6
2	.858	.937	.789	.148	75.7	86.5	66.0	20.5
3	.830	.885	.774	.111	78.4	88.3	70.7	17.6
4	.898	.990	.829	.161	77.0	86.5	68.5	18.0
5	.892	.972	.818	.154	78.8	88.0	71.0	17.0
6	.923	.998	.884	.114	72.7	75.0	70.0	5.0
7	.891	30.027	.833	.191	71.9	84.5	68.0	16.5
8	.887	29.973	.828	.145	72.7	81.0	66.6	14.4
9	.954	30.021	.891	.130	72.3	80.5	65.0	15.5
10	.951	.030	.880	.150	73.2	83.5	63.8	19.7
11	.910	.003	.829	.174	75.9	86.5	67.0	19.5
12	.856	29.931	.776	.155	79.1	90.7	69.3	21.4
13	.815	.889	.747	.142	80.4	89.8	73.0	16.8
14	.865	.956	.792	.164	77.4	83.8	73.0	10.8
15	.902	.979	.839	.140	77.9	89.0	68.5	20.5
16	.908	.980	.859	.121	79.5	90.0	71.2	18.8
17	.908	.989	.835	.154	81.3	91.6	73.0	18.6
18	.884	.971	.816	.155	80.8	91.4	72.0	19.4
19	.823	.901	.714	.160	81.6	93.5	72.8	20.7
20	.781	.849	.701	.148	82.8	95.0	71.5	20.5
21	.803	.878	.731	.147	83.1	94.7	75.5	19.2
22	.784	.853	.702	.151	81.6	97.8	75.0	22.8
23	.780	.843	.705	.138	85.8	99.0	76.5	22.5
24	.798	.890	.731	.159	85.8	97.0	77.0	20.0
25	.822	.915	.756	.159	85.4	95.0	78.0	17.0
26	.786	.849	.724	.125	84.7		77.6	17.9
27	.792	.863	.724	.139	83.4		77.0	16.2
28	.819	.884	.763	.121	83.4	93.0	76.0	17.0
29	.896	.968	.833	.135	83.1	92.4	77.0	15.4
30	.896	.974	.822	.152	82.9	93.2	75.5	17.7
31	.865	.944	.770	.174	84.3	97.5	75.7	21.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb, Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.--(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
.	°	°	°	°	Inches.	T. gr.	T. gr.	
1	62.8	12.0	54.4	20.4	0.134	4.72	4.54	.051
2	66.5	9.2	60.1	15.6	.525	5.70	3.81	.60
3	71.9	6.5	67.3	11.1	.666	7.21	.10	.70
4	69.1	7.9	63.6	13.4	.590	6.40	.49	.65
5	72.0	6.8	67.2	11.6	.664	7.17	.27	.69
6	68.6	4.1	65.3	7.4	.623	6.83	1.85	.79
7	69.1	5.8	65.0	9.9	.617	.73	2.55	.73
8	67.5	5.2	63.3	9.4	.584	.39	.29	.74
9	64.0	8.3	57.4	14.9	.480	5.25	3.33	.61
10	64.7	8.5	57.9	15.3	.488	.33	.49	.60
11	67.1	8.8	60.9	15.0	.539	.86	.71	.61
12	71.7	7.4	66.5	12.6	.618	7.00	.53	.67
13	74.0	6.4	69.5	10.9	.715	.71	.23	.71
14	71.6	5.8	67.5	9.9	.670	.27	2.74	.73
15	69.0	8.9	62.8	15.1	.574	6.22	3.94	.61
16	69.9	9.6	63.2	16.3	.582	.28	4.38	.59
17	70.0	11.3	62.1	19.2	.561	.03	5.21	.54
18	70.0	10.8	62.4	18.4	.567	.10	4.97	.55
19	72.5	9.1	66.1	15.5	.610	.87	.47	.61
20	75.2	7.6	69.9	12.9	.725	7.77	3.98	.66
21	76.7	6.4	72.2	10.9	.781	8.36	.50	.71
22	75.9	8.7	69.8	14.8	.722	7.71	4.68	.62
23	76.5	9.3	70.0	15.8	.727	.74	5.09	.60
24	75.5	10.3	68.3	17.5	.688	.33	.50	.57
25	75.8	9.6	69.1	16.3	.706	.53	.15	.59
26	74.4	10.3	67.2	17.5	.664	.09	.33	.57
27	77.8	5.6	73.9	9.5	.824	8.83	3.13	.74
28	77.6	5.8	73.5	9.9	.814	.72	.24	.73
29	76.7	6.4	72.2	10.9	.781	.36	.50	.71
30	75.1	7.8	69.6	13.3	.717	7.69	4.10	.65
31	75.8	8.5	69.8	14.5	.722	.71	.57	.63

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.864	29.984	29.794	0.190	75.3	81.0	67.6	13.4
1	.853	.975	.781	.194	74.8	81.0	66.8	14.2
2	.843	.965	.768	.197	74.2	80.8	66.0	14.8
3	.835	.952	.749	.203	73.7	80.5	65.5	15.0
4	.833	.941	.750	.191	73.2	80.3	65.0	15.3
5	.850	.952	.762	.190	72.6	80.0	64.0	16.0
6	.869	.968	.782	.186	72.1	79.0	63.8	15.2
7	.888	.980	.803	.177	72.2	78.0	63.9	14.1
8	.916	30.003	.827	.176	74.6	80.5	67.5	13.0
9	.933	.023	.813	.180	78.2	84.1	68.4	15.7
10	.937	.030	.812	.188	81.4	88.0	72.0	16.0
11	.926	.022	.831	.191	84.3	91.8	74.0	17.8
Noon.	.901	.004	.802	.202	86.6	94.5	74.8	19.7
1	.867	29.970	.761	.209	88.1	96.6	73.7	22.9
2	.837	.917	.736	.211	89.1	98.0	73.0	25.0
3	.814	.936	.716	.220	89.6	99.0	73.5	25.5
4	.801	.924	.701	.223	89.5	99.0	74.2	24.8
5	.798	.916	.702	.214	87.9	98.0	75.0	23.0
6	.805	.925	.723	.202	84.9	93.0	74.5	18.5
7	.818	.940	.736	.204	81.8	87.5	73.6	13.9
8	.841	.966	.767	.199	79.7	85.3	72.8	12.5
9	.860	.987	.782	.205	78.3	84.0	71.3	12.7
10	.873	.997	.805	.192	77.0	82.4	70.0	12.4
11	.872	.995	.803	.192	76.1	82.0	68.9	13.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb^d
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night	71.8	3.5	69.3	6.0	.0711	7.74	1.66	0.82
1	71.5	3.3	69.2	5.6	.708	.72	.51	.83
2	71.3	2.9	69.3	4.9	.711	.75	.34	.85
3	70.9	2.8	68.9	4.8	.701	.66	.30	.86
4	70.6	2.6	68.5	4.7	.692	.57	.25	.86
5	70.1	2.5	68.1	4.5	.684	.47	.19	.86
6	69.7	2.4	67.8	4.3	.677	.42	.11	.87
7	69.8	2.4	67.9	4.3	.679	.45	.10	.87
8	71.0	3.6	68.5	6.1	.692	.56	.61	.82
9	72.1	6.1	67.8	10.4	.677	.33	2.92	.72
10	72.5	8.9	66.3	15.1	.644	6.49	4.33	.62
11	72.6	11.7	64.4	19.9	.605	.47	5.81	.53
Noon.	72.2	14.4	63.6	23.0	.590	.27	6.87	.48
1	72.2	15.9	62.7	25.1	.572	.08	7.64	.44
2	72.1	17.0	61.9	27.2	.547	5.90	8.22	.42
3	72.0	17.6	61.4	28.2	.548	.80	.53	.41
4	72.1	17.4	61.7	27.8	.554	.85	.44	.41
5	72.2	15.7	62.8	25.1	.574	6.10	7.54	.45
6	73.0	11.9	61.7	20.2	.611	.53	5.96	.52
7	72.8	9.0	66.5	15.3	.618	.97	4.43	.61
8	72.8	6.9	68.0	11.7	.631	7.35	3.37	.69
9	72.6	5.7	68.6	9.7	.695	.52	2.76	.73
10	72.5	4.5	69.3	7.7	.711	.70	.49	.78
11	72.3	3.8	69.6	6.5	.717	.79	1.84	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
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in the month of March 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles	
1	139.5	...	Variable.	...	75.6	B.
	140.5		N N W & S		56.5	B.
3	142.5		S		122.8	B to 8 A. M., \nearrow to 4 P. M. B to 11 P. M.
4	139.5		S & S E	0.8	216.8	B to 3 A. M., \searrow to 2 P. M., \searrow to 11 P. M.
5	141.3		S by E & S	0.5	90.9	Clouds of different kinds, S. to 5 A. M. O to 7 P. M., \searrow to 9 P. M., \nearrow to 11 P. M. Slightly foggy at 11 P. M. Light R between 6 & 7, at 12 A. M., 2 & 5½ P. M.
6	—	0.02	Variable.		159.6	
	137.5	0.10	S & Variable.		96.2	Clouds of different kinds. Tat 8½ A. M. Light R between 3 & 4 & at 9 A. M.
	138.2	1.06	Variable.	6.0	138.1	S to A. M. O to 9 A. M., \searrow & \nearrow to 7 P. M. B to 11 P. M. High wind between 1½ & 2 A. M. Slightly foggy from 8 to 10 P. M. Lightning from midnight to 2 A. M. B from 2½ to 7 A. M.
	136.5	..	W, N W & N by E		109.4	B.
			W N W			
10	138.0		E S E, E by N &		116.0	B.
11	139.0		E & N W		75.5	B to 11 A. M., \nearrow to 3 P. M. B to 11 P. M. Slightly foggy from 5 to 7 A. M.
12	145.0		S by W		120.9	B. Slightly foggy at 6 A. M.
13	144.0		S S W		143.8	B to 11 A. M., \searrow & \nearrow to 2 P. M. B to 4 P. M., \searrow to 11 P. M.
14	139.4		S S W & N W	2.8	134.9	B to 5 A. M., \searrow to 10 A. M. O to 8 P. M., \searrow to 11 P. M. Brisk wind at 2½ P. M. D at 3½ P. M.
15	142.0		S & S S W		146.1	\searrow to 4 A. M. B to 8 A. M. \searrow to 11 P. M.
16	144.0		Variable.		91.2	O to 6 A. M. \searrow to 10 A. M. B to 6 P. M. \searrow to 11 P. M.

\nearrow i Cirri, — i Strati, \nearrow i Cumuli, \searrow i Cirro-strati, \nearrow i Cumulo-strati, \searrow i Nimib, \searrow i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure Daily velocity.	
				lb.	Mile.
17	142.5		S by E & E		91.4
					∩ i to 4 A. M. ∩ i to 7 A. M. ∩ i to 2 P. M. ∩ i to 6 P. M. B to 11 P. M.
18	142.0		S, S S W & W N W		104.8
19	141.0		S W & S		135.1
					B to 3 P. M. ∩ i to 5 P. M. B to 11 P. M.
20	140.2		S & S W	0.4	216.8
					B to 1 P. M. ∩ i to 4 P. M. B to 11 P. M.
21	141.8		S by W & S W	0.2	329.9
22	145.0		S S E & S S W	0.2	115.2
23	143.0		S, S W & N W	0.2	191.1
24	144.5		W S W & S by W		165.5
25	141.5		Variable.		122.3
26	140.0		S by W & S		137.8
27	137.0		S & S by E	0.2	191.7
28	139.0		S by E & S		216.7
					B to 6 A. M. S to 10 A. M. B to 11 P. M.
29	139.0				180.2
					B to 4 A. M. S to 8 A. M. B to 11 P. M.
30	138.8		S by E & S by W		173.1
					B to 11 A. M., clouds of different kinds to 8 P. M. B to 11 P. M. Foggy from 5 to 7 A. M. T & L at 7 P. M.
31	142.7		S by E & S		224.7
					B.

∩ i Cirri, — i Strati, ∩ i Cumuli, ∩ i Cirro-strati, ∩ i Cumulo-strati, ∩ i Nimbi, ∩ i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, E rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.860
Max. height of the Barometer occurred at 10 A. M. on the 10th ...	30.030
Min. height of the Barometer occurred at 4 P. M. on the 20th ...	29.701
Extreme range of the Barometer during the month	0.329
Mean of the daily Max. Pressures	29.939
Ditto ditto Min. ditto	29.792
Mean daily range of the Barometer during the month	0.147

	°
Mean Dry Bulb Thermometer for the month	79.8
Max. Temperature occurred at 3 & 4 P. M. on the 23rd	99.0
Min. Temperature occurred at 6 A. M. on the 10th	63.8
Extreme range of the Temperature during the month	35.2
Mean of the daily Max. Temperature	90.0
Ditto ditto Min. ditto,	71.9
Mean daily range of the Temperature during the month	18.1

Mean Wet Bulb Thermometer for the month	71.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	8.0
Computed Mean Dew-point for the month	66.2
Mean Dry Bulb Thermometer above computed mean Dew-point	13.6

	Inches.
Mean Elastic force of Vapour for the month	0.642

	Troy grain.
Mean Weight of Vapour for the month	6.92
Additional Weight of Vapour required for complete saturation	3.83
Mean degree of humidity for the month, complete saturation being unity	0.64

	°
Mean Max. Solar radiation Thermometer for the month	140.8

	Inches.
Rained 4 days.—Max. fall of rain during 24 hours	1.06
Total amount of rain during the month	1.18
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	0.98
Prevailing direction of the Wind	S. & S. by E.

* Height 70 feet 10 inches above ground.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MAY, 1873.

A meeting of the Asiatic Society of Bengal was held on Wednesday, the 7th instant, at 9 P. M.

Col. Hyde, R. E., President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following presentations, received since the last meeting, were laid on the table—

1. From the Government of India, Home Department; a copy of a photograph, taken by J. H. Ravenshaw, Esq., C. S., of a pillar dug up at Bannagar in Dinájpúr.

2. From Sirdár Attar Singh Bahádúr, Chief of Bhadaur, one silver and several copper coins.

Mr. Blochmann said that the copper coins were all known and published, and belonged to the reigns of Mu'izz, Balban, and Muhammad Tughluq. One was a brass token of the forced currency of the last king. The silver coin was modern, but too much was cut away to allow of a reading.

From the Government of India, Home Department, a set of 11 photographs of views of Sunnárgháon, taken by Mr. Brennand, Principal of the Dacca College.

Mr. Blochmann said that the members would be disappointed if they expected to find among the remains of Sunnárgháon large and old buildings. The ruins are few, and belong to the 14th and 15th centuries, just as the inscriptions found there belonged to the same time. Dr. Wise, in a letter to him, remarked that the people there knew nothing of the importance of this old town; not a single legend was known now-a-days. The splendour of the Nawábi period; the encroachment of the river; and the fact that towns in southern Bengal are collections of mud houses rather than what we understand by towns, go far to explain this fact. Though, like Sâtgháon, the seat of Muhammad governors and usurping kings, it is probable that neither town ever covered an extensive site.

Dittapara
Palkrishna Public Library.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected Ordinary Members—

G. R. C. Williams, Esq., C. S.

H. B. Urmston, Esq., H. M.'s 1-14th Regt.

W. Mackay, Esq., C. E.

The Rev. John Hector, M. A.

The following is a candidate for ballot at the next meeting—

J. W. Johnston, Esq., M. D., 4th Regt. P. I., Abbotabad, proposed by Captain J. Waterhouse, seconded by H. Blochmann, Esq., M. A.

The Council reported that on the recommendation of the Philological Committee they will print in their *Bibliotheca Indica*, Captain Graham's English translation of *Badáoní*.

Col. Hyde exhibited electrotypes of 200 Greek coins from the British Museum.

Mr. Blochmann exhibited the following Arabic and Persian inscriptions received from members of the Society.

1. From Mr. J. G. Delmerick, Dihli, tracings of the following inscriptions from Sonpat. Mr. Blochmann reads and translates them as follows—

1. The Sonpat Mosque.—Balban's reign.

تجدد هذه العمارة المسجد المبارك الجامع في نوبة السلطان الأعظم ظل الله في
العالم غياث الدنيا والدين القائم بامر الرحمن ابوالمظفر بلبن السلطان ناصر امير
المؤمنين خاد الله ملكه و سلطانه العبد الضعيف مير بيگ بن احمد بيگ مقطع
سونپت في التاريخ رمضان المبارك عظم الله حرمة سنة سبعين و ستمائة ۱۱

This building, the blessed Jāmi 'Mosque, was renewed during the reign of the great King, the shadow of God on earth, Ghiyāsuddunyā waddīn, who stands by God's order, Abul Muzaffar Balban, the King, the aider of the Commander of the Faithful—may God perpetuate his kingdom!—by the weak slave Mīr Beg, son of Ahmad Beg, the *muqī'* (Jāgīrholder) of Sonpat. Dated, the auspicious month of Ramazān (may God increase its honor!), 670.

The name of the founder is not quite certain, as the diacritical marks are wanting; it may be Mīr Lang instead of Mīr Beg; but the name of Ahmad Beg is clear. The letters of the inscription are thick and clumsy.

2. The Khwa'jah Khizr Kha'n Darga'h, of Sonpat.

مرتب شد عمارت دهلیز حظیرہ میان خواجہ خضر بن دریا خان شیروانی
رحمة الله عیالهما يوم الاثنين الخامس عشر من شهر شوال سنة ثمان عشرون وتسعمائة
في عهد السلطان العادل البادل الوائق بتائید الرحمن ابوالمظفر ابراهیم شاه بن
سکندر شاه بن بهلول سلطان خلد ملکه و سلطانه ۱۱

The portico of the tomb of Khwájah Khizr Khán, son of Daryá Khán Shirwání—may God have mercy upon both !—was erected on Monday, 15th Shawwál, 928, in the reign of the just and liberal King, who relies on the assistance of the Merciful, Abul Muza'ffar Ibráhím Sháh, son of Sikandar Sháh, son of Buhlúl, the King. May God continue his kingdom and reign !

بمعون الله تبارك و تعالیٰ و فضله عمارت گنبد این حظیرہ بندگی میان معظم
و مکرم میان خواجہ خضر مرحوم مغفور بن دریا خان بن شیخ المشایخ شیخ احمد
بن ملک المشایخ شیخ مندوکي درویش شیروانی علیہم الرحمة و الغفران مقطع
قصبہ سرنیتہ در عہد حضرت سلطان السلاطین مہمد قواعد الاسلام و الدین ظل الله
فی العالمین الوائق بتائید الرحمن ابوالمظفر ابراہیم شاہ بن سکندر شاہ بن بہلول
شاہ سلطان خلد ملکہ و سلطانہ تمام شد بفرمایش لنگر خان خضر در پانزدہم ماہ
رجب رجب قدرہ سنۃ ثلثون و تسعمایۃ ॥

With the help of God, who is blessed and exalted, and by His grace, the building of this tomb of the great and noble saint, Miyán Khwájah Khizr Khán, the deceased, the pardoned, son of Daryá Khán, son of the Shaikh of Shaikhs Shaikh Ahmad, son of the king of Shaikhs Shuikh Mandúkí Darwísh Shirwání—may God have mercy upon them,—zamíndar of the town of Sonpat'h, was completed in the time of the king of kings, the confirmer of the laws of Islám and the faith, the shadow of God in both worlds, who trusts to the aid of the Merciful, Abul Muza'ffar Ibráhím Sháh, son of Sikandar Sháh, son of Buhlúl Sháh, the King—may God perpetuate his kingdom and rule !—by order of Langar Khán Khizr, on the 15th Rajab—may the honor of this month increase,—A. H. 930.

Regarding these three inscriptions, Mr. Delmerick has the following note :

'The first inscription is of the time of Ghiyásuddín Balban and bears the date Rajab, A. H. 670, or A. D. February, 1272. There is only one other inscription of the time of this monarch extant, as far as I know, viz., that on the walls of the Jámí' Masjid at Garhmukhtesar in the Mirat District, and noticed by 'Thomas in his book on the Chronicles of the Pathan Kings of Dilhi, page 136.

'The inscription now for the first time published, is on the walls of the Masjid of Sayyid Naqíruddín 'Abidullah at Sonpat.

'Local tradition states that Sayyid Naqíruddín 'Abidullah bin Ahmad, who was usually called Abbá Muhammad Naqir, came from Arabia viâ Egypt to Nishápúr, where hearing that the Rájah of Kanauj gave large prices for Turkí horses, he bought a number of such horses and resolved to take them himself to India for sale. He had sixty servants with him. On reaching Sonpat, Rajah Arjun Deo, who was the Governor of the District, prohibited the Sayyid from proceeding further, and wanted to get the horses by force. There was a fight and the Sayyid together with fifty-nine of his followers suffered martyrdom. Arjun Deo himself and many other Hindús were slain in this contest. One man alone of the Sayyid's party escaped. His name was Jauhar. He was protected by, and found an asylum with, Sheo Chand, a Brahman,

whose descendants are still residents of the town, and are the hereditary Qánúngos of the parganah.

'The date of the death of the Sayyid or horse merchant is said to be the 12th of Muharram, A. H. 287, or A. D. 19th January, 900.

'The second inscription is over the doorway of the building which covers the tomb of Khwájah Khizr Khán, and is dated the 11th Rajab, A. H. 930, or A. D. 16th May 1523. It is a beautiful edifice solidly constructed of sandstone, and in tolerably good preservation. The dome is lofty and grand.

'I have been unable to ascertain what particular office or rank this Khwájah Khizr, the son of Daryá Khán Shirwání, held at the time of his death.

'There was a celebrated chief of that period called Daryá Khán Lodí, who lived up to the time of Bábar's conquest of Hindústán; for he it was, as is commonly asserted by Muhammadan Historians, who invited Bábar to invade his master's dominions.

'Firishtah relates that "one day while the King (Sikandar Lodí) and "his court were playing at *chaugán*, the bat of Haibat Khán Shirwání* by "accident came in contact with the head of Sulaimán, the son of Daryá Khán "Lodí, who received a severe blow. This was resented on the spot by Khizr "Khán, the brother of Sulaimán, who galloping up to Haibat Khán struck "him violently on the skull. In a few minutes both sides joined in the "quarrel, and the field was in uproar and confusion. Muhammad Khán Lodí "and KhánKhánán Lodí interposing endeavoured to pacify Haibat Khán, "and succeeded in persuading him to go quietly home with them."

"The king apprehensive of conspiracy retired immediately to the "palace, but nothing more transpiring he made another party at the same "game a few days after. On the road to the playground Shams Khán, a "relative of Haibat Khán Shirwání, perceiving Khizr Khán, the brother of "Sulaimán Lodí, instantly attacked him with his bat and knocked him off "his horse. The king abused Shams Khán grossly, and returned to his palace, "and could not be persuaded but that there was some plot in agitation."

'In the above account, if we read Haibat Khán Lodí for *Shirwání*, Daryá Khán Shirwání for *Lodí*, and Sulaimán Shirwání for *Lodí*, we shall find that a Lodí struck a Shirwání, upon which the brother of the Shirwání assaulted the Lodí. The quarrel was made up for the time by other Lodís persuading their kinsman to go quietly home with them. As the narrative at present stands, if we follow Firishtah strictly to the letter, we are perplexed in think-

* In the *Tárikh-i-Dáúdí*, (*vide* page 463 of Elliot's Muhammadan Historians of India, Vol. IV) it is said that the bat of Daryá Khán *Shirwání* struck Sulaimán, but this is manifestly an error, and shows that a confusion of titles and even names is not by any means uncommon with Indian writers or copyists.

ing how the Lodís could have pacified a Shirwání so soon after the quarrel, and how they should have taken him to their home, which was not the home of the offended Shirwání. I am inclined, therefore, to correct the text of Firishtah to the extent above suggested, as I believe the same to be an error. Thus I almost certainly identify Khwájah Khizr Khán Shirwání of the inscription with the Khizr Khán who took so prominent a part in the scuffle above described.

'It is also stated by Firishtah that Khizr Khán was present during the successful operations against Chanderí, which took place during the latter part of the reign of Sikandar Lodí.

Another interesting inscription received from Mr. J. G. Delmerick, is the following, from the tomb of the renowned saint Bú 'Alí Qalandar, Pánípat. Mr. Delmerick says that the building has pillars of *kasáoti*, or touchstone, to which allusion is made in the inscription; but there are no other inscriptions at Pánípat.

Bú 'Alí Qalandar died at Pánípat on the 13th Ramazán, 724, or September, 1324; *vide* Proceedings, As. Society, Bengal, for April, 1870, p. 125.

Pa'ni'pat Inscription.

همچو عیسیٰ مردۀ را بخشد روان	مظهر نور جلال است و جمال
خان بن خان است رزق الله خان	از مقرب خان است اولادون دهر
زان شرف گشته ارسطوی زمان	بوعلی چون بوعلی شیناس کرد
هرستون سنگ صحت در زیر آن	تا بنا فرمود ایوان چو خلد
چون طلای کیمیا کردم عیان	از خرد جستم عیار سال او
شد بوالا جاه رزق الله خان	سال تاریخ بنایش در حساب

1. This tomb is the place where the light of God's glory and perfection appears; like Jesus, it gives life to the dead.

2. Muqarrab Khán, the Plato of his age, had a son Rizqullah Khán.

3. When Bú 'Alí [the Pánípat Saint] recognized this Bú 'Alí [*i. e.* this great doctor], he [Rizqullah], thus honored, became the Aristotles of his age.

4. He then ordered the erection of this paradisiac portico, below which each pillar is made of touchstone.

5. I put thought to the touch, in order to discover the year of the building, when I beheld the gold of alchemy,

6. And the year of its erection appeared in the value of the letters 'the noble Rizqullah Khán' [1071, A. H., or A. D. 1660].

Regarding Muqarrab Khán and his son Rizqullah Khan, *vide* my *Aín* translation, pp. 544, 545. Rizqullah died in the 10th year of Aurangzib's reign. The *Maásir-ul-Umará* states that the Dargáh itself was built by Muqarrab Khán.

2. From Ganga Parshád, Esq., Deputy Collector, Murádábád, several readings of inscriptions from Sambhal, Amrohah, and Murádábád, N. W. P. The translations are by Mr. Blochmann.

1. Bábar's Mosque at Sambhal.

This mosque, according to Mr. Ganga Parshád, "is situated in Mahallah Kot, and faces east. It was originally a Hari Mandir, and was converted into a mosque by Bábar's order. At the side is a tank for ablutions, and a very old well. The mosque has still a chain for the suspension of a bell, and a passage at the back for the wheeling round of worshippers. There are many inscriptions on stone tablets in this mosque shewing the dates of erection and repairs." The oldest is the following (metre, short *Ramal*)—

جامع ابنیہ فضل و کمال * رافع الوبیہ ملک و ملل
باسط اجلہ امن و امان * بانی ابنیہ علم و عمل
شاہ جم جاہ محمد بابر * جفظ اللہ له عز و جل
شمع دولت چو برفروخت به ہند * روشن از پرتو آن شد سنبہل
از پی ساختن این مسجد * کہ مصون باد ز نقصان و خلل
کرد فرمان بہ کمین بندہ خویش * کہ بود عمدہ ارکان دول
میر با عقل و خرد ہمدو بیگ * آن بہ اخلاق نکو گشت مثل
چون ز فرمان شہنشاہ جہان * یافت اتمام بہ توفیق ازل
سال تاریخ و مہ و روزش گشت * یکم از شہر ربیع الاول
سنہ ۹۳۳ ہجری

1. The collector of buildings of grace and beauty, the raiser of the standards of rule and of faith,

2. The spreader of the wings of peace and tranquillity, the builder of the buildings of knowledge and deed,

3. Muhammad Bábar, a Jam in dignity,—may God Almighty have him in His keeping!—

4. Kindled in India the lamp of power, when a ray of it fell upon Sambhal.

• 5. To build this mosque—may it be protected against destruction and decay!—

6. He gave orders to his mean slave, who is one of his principal officers,

7. Mír Hindú Beg, the intelligent and wise, who is an example to others in polite manners.

8. And when in consequence of the order of the sovereign of the world, by the guidance of Providence, the mosque was completed,

9. Its date was "the first day of the month of Rabf' I." (A. H. 933, or, 6th December, 1526, A. D.).

This mosque was repaired in A. H. 1067 (A. D. 1656-57) by Rustam Khán Dak'hini, as stated in the following *Tárikh*—

کرد تزیین مسجد جامع * خان رستم خطاب نیک نہاد
سال تاریخ اسعدی بنوشت * رونق خانہ الہی داد

1. The Jámí' mosque was adorned by the excellent Khán, whose title is Rustam Khán:

2. The poet As'adí wrote down as *Tárikh* the words 'He adorned God's house.' (A. H. 1067.)

Two other tablets mention the *Tárikhs*—(1) buq'ah i faiz ; and (2) Sijdahgáhé khalq kardah.

2. The Mura'da'ba'd Mosque.

Murádábád is the old Chauplah or Chaupalah, so called from including in its boundary four villages, viz., Bhadaurá, Dindárpúrah, Mánpúr, and Dihri. Rustam Khán Dak'hiní called it Murádábád in honor of Prince Murádbakhsh, Sháhjahán's son. The Jámí' mosque, on the right bank of the Rámangá, stands on a high mound close to the bank, and has the following inscription—

نه بوده در مرادآباد مسجد * كه بد بس كافرو هندو درانجا
 شه عادل شهاب الدين غازى * به رستم خان عطا فرمود آرا
 بنا فرمود عالي قدر خان * در انجا مسجد عطا و زيبا
 بناء دين خود را كرد محكم * به دنيا دين خود را كرد بالا
 پي تاريخ او هر نكته دان * شده در بحر فكر از طبع رعا
 زدانايان يك زن بحر معني * برون آورد بولوت مصفا
 درخشنده در اينست بشنو * ز احوازي نه از خسرو مسيحا
 كه رستم خان ز الطاف الهي * بناي خانك دين كرده بالا
 سنه ۱۰۴۶ هجري

1. There was no mosque in Murádábád, where only Infidels and Hindús lived ;

2. The just king Shiháb-uddín Ghází (Sháhjahán) gave it, therefore, to Rustam Khán,

3. And ordered this excellent officer to build in the town a pretty and graceful mosque.

4. Thus he firmly established the building of his religion, and elevated, in this world, his faith.

5. Many a clever writer, in order to find a *tárikh*, dived ingeniously into the ocean of thought,

6. And one of the wise, thus diving, brought up a pure pearl.

7. The lustrous pearl is this, now listen,—it belongs to (the poet) Ahrarí, not to the prophet Elias and the Messiah,—

8. 'Rustam Khán, by God's grace, reared the building of the house of faith.' (A. H. 1046, or 1636, A. D.)

Mr. Blochmann said :—

The builder of the mosque, Rustam Khán Dak'hiní, is frequently mentioned in the histories of Sháhjahán's reign. The *Madsir ul Umard* also has a biographical note, from which I extract the following :

Rustam Khán was a Chirgiz from Mount Elburz. He was sold as a slave, and came into the possession of the Nizám ul'mulk of the Dak'hin.

His master, however, promoted him, made him an Amír, and gave him the title of Muqurrah Khán. He fought with his master against Sháhjahán (3rd year of his reign). When the Nizám ul mulk imprisoned Fath Khán, (son of the renowned Malik 'Ambar) who had been Vakíl and Commander-in-Chief, Muqarrab Khán received the command of the army, and Hamíd Khán Habshí was made Vakíl. A short time after, Fath Khán was released and restored to his office. Muqarrab Khán was, therefore, deposed; and annoyed at this treatment, he fled to A'zam Khán, one of Sháhjahán's officers, for protection, and solicited an appointment of the emperor. Sháhjahán received him favorably, gave him presents and a lák'h of rupees, and appointed him a commander of Five Thousand. Sometime after, in the fifth year of his reign, the emperor gave him Sambhal as *tuyúl*, and, in the 18th year, the title of *Rustam Khán*. He then accompanied Prince Aurangzib on his expedition against Jhujhár Singh Bundelá, and in the 10th year, he devastated, with Sayyid Khán Jahán Bárha, the country of 'Adil Sháh, and was then allowed to go again to his jágir. In the 15th year, he operated with Prince Murádbakhsh against Jagat Singh of Mau, and accompanied Dárá Shikoh to Qandahár. In the 19th year, he was ordered to accompany the army to Balkh, but to stay during the winter in Rohtás; and when the emperor returned from Kashmír, Rustam Khán accompanied Prince Murádbakhsh, whose left wing he commanded. After the conquest of Balkh, the Prince did not wish to stay any longer with the army, and the emperor sent Sa'dullah Khán to Balkh. He sent Rustam Khán to occupy Andkhúd and environs, and Rustam Khán defeated the Uzbaks in several smart engagements. When Aurangzib, after his arrival in Balkh, left the country to Nazr Muhammad Khán, Rustam Khán returned to his jágir in India. In the 21st year, he was present at the royal feast in the (new built) palace of Sháhjahánábád. Soon after, he was sent to Kábul. In the 22nd year, on the rumour of a march of the Persians upon Qandahár, Aurangzib was sent there, and Rustam Khán commanded the rear; but a short time after arrival before Qandahár, he was sent to Bust, where he defeated the Persians, and took eleven guns with material. Sháhjahán gave him the title of Firúzjang, and made him, on his return, a commander of Six Thousand, with 5000 horse. In the 25th year, he was again with Aurangzib before Qandahár, and again occupied, in the 27th year, the town of Bust, under Dárá Shikoh. But not long after, the siege of Qandahár had to be raised, and Rustam Khán returned. In the 28th year, he marched with Sa'dullah against Chitor. In the following year, by Dárá's order, he was sent to Kábul, from where he was recalled in the 31st year, when the war for the succession had broken out. Rustam Khán attached himself to Dárá Shikoh, and commanded, with Prince Sipíhr Shikoh, the left wing in the battle of Samogar, near Ágrah, in which Aurangzib defeated Dárá. He was wounded, and died soon after of his wounds (1668).

3. The Mosque of Amroha.

The following inscription is on the Jāmi' mosque of the old town of Amroha. The town is rarely mentioned during the Mughul period; but its families of Sayyids were renowned, like those of Mānikpūr, Bilgrām, and Bārha. To them belonged the builder of the mosque, Sayyid Muhammad, of Amroha, who held the post of Mir 'Adl, or Chief Justice, in the first half of Akbar's reign; *vide* my *Kin* translation, pp. 438, 490, where his biography will be found.

The inscription is (Metre, *Mujtass*).

به عهد اکبر غازی جلال دولت و دین
مدار ملک و ملل پادشاه ظل اله
زمانه خادم درگاه اوست بے تکلیف
ستاره بندۀ فرمان اوست بے اکراره
بنا نمود در امروه مسجد جامع
معز دین محمد امیر خلق پناه
سپهر مرتبه سید محمد عادل
که وصف ارشده اوراد خلق بے گه و گاه
مگو ز های اخیر و بگوی نارنجش
بنای میر عدالت پناه عالیچاه

1. In the reign of Akbar, the victorious, the glory (*jaldl*) of power and religion the pivot of the kingdom and of the faith, the Pādishah, the shadow of God,—

2. (Time, without exaggeration, is the servant of his throne; the stars, without hesitation, are his obedient servants),—

3. The Jāmi' mosque at Amroha, was built by the ornament of Muhammad's religion, the nobleman with whom people take refuge,

4. Of exalted dignity, Sayyid Muhammad, the just, to whose praise people at all times sing homilies.

5. Leave out the final *ha*, and you will find the date in the words, 'the building of the exalted Chief Justice.' (i. e. 996—16, = A. H. 980, or A. D. 1572.)

4. The Fort of Amroha.

The following inscription belonged to the Fort of Sayyid 'Abdul Majid, *alias* Diwān, at Amroha. The fort no longer exists; only a portion of the wall and gate is preserved.

الله اکبر

در عهد سلطان عالیشان صاحبقران ثانی شهاب الدین محمد شاهجهان پادشاه
غازی خلدالله ملکه سیادت مآب میرون سید همدان این قلعه بنانمود *
شد چو این قلعه خورمی افزا * خوب مضبوط و خاص مستحکم
خواستم سالش از دیپر خرد * گفت بشمار قلعه خورم
سنه ۱۰۵۱ هجری

باهتم بنده کمال خان خانزاد شهر رمضان المبارک سنه ۱۰۵۱ هجری

God is Great !

In the time of the great king, the second Lord of Conjunction, Shiháb uddin Muhammad Sháh jahán Pádisháhi Ghází—may God perpetuate his reign !—this fort was built by the refuge of Sayyida, Mírán Sayyid Hamadán.

1. When this joy-increasing fort, beautiful, firm, and exceedingly strong, was built,

2. I took counsel with Thought and asked for a *tárikh*, when he said, "Count the letters in the 'happy fort'." (A. H. 1051).

Built by the servant Kamál Khán Khánahzád, in the blessed month of Ramazán, 1051. (December, 1641.)

The names of the builder and the architect do not occur in the '*Pádi-sháhnámah*.'

Mr. J. G. Delmerick has also sent to the Society readings of the following Sanskrit Inscriptions, which have been translated by Bábu Rájendralála Mitra.

1. S'arabala Inscription, Hariya'na' District.

1. Salutation to that Gaṇádhīpati (a) by adoring whose feet mankind obtain all that they can wish.

2. May Satyala (b) with (his wives) Ambávati and Ambá, preserve you,—the god by whose grace worshippers become objects of happiness.

3. There is a country named Hariyána, which is like unto a heaven on the earth, and there stands in it the city of Dhīlī built by the Tomaras.

4. After the Tomaras, the Cháhamānas, who were ardent in protecting their people, reigned in that city, whose enemies were all overcome.

5. Next the Mlechchha Sahábadīn, (c) the fire of whose vigour had consumed to ashes the forest of his enemies, took the city by his might.

6. Thenceforward up to this day it has been in the possession of the Turushkas, and now the auspicious King Muhammad Sāhi (d) rules it.

7. Next. In that city dwelt a family of merchants of Agrotola. (e) In it was born a Sádhu, named Sava-deva.

8. His son was Lakshmīdhara, who was like a bee on the two lotus-like feet of the lord of Laksmī (Vishṇu). He was constant in the adoration of the gods and Bráhmans, and was celebrated for his good-will towards all created beings.

9. He had two sons, both not of this sinful Kali age, both like oceans of greatness; the first, by name Māhā, was of mature understanding; the younger Ghiká was of great fame.

10. Māhā had a beautiful son named Mehlá, who was always bent on worshipping the gods, Bráhmans and seniors.

11. Ghiká married the daughter of S'rīdhara, named Vīro, who was devoted to her husband. By her he had two sons.

12. The elder (of these two) was Khetala, an ocean of goodness and of polished behaviour. The younger was named Paitúka; (f) his mind was full of respect for all seniors and Bráhmans.

13. In the minds of these two merchants, (Sádhus) Khetala and Paituka, always disposed to meritorious works, a spot of ground outside the goodly village of S'arabala appeared agreeable,

14. There, for the eternal enjoyment of heaven by their parents, and for attainment of offspring, Khetala and Paituka caused a well to be excavated.

15. This was written on Tuesday, the 5th of the waxing moon, in the month of Phālguna, in the year of the Veda, Vashu, fire and themoon (g) of the era of Vikramārka.

16. In the village of Sārabala in the Pratigana (h) of Indraprastha, may this well last for ever, as also its maker with his family !

Samvat 1384, Phālguna Sudi 5, Tuesday.

Notes.

a. Gages'a.

b. I know of no Hindu divinity of this name, and therefore suspect this to be a mislection of some other word for S'iva, the husband of Ambā.

c. This is of course the Indian Corruption or Sanskritisation of Shihāb-uddin.

d. In Sanskrit and old Hindi writings the Semitic Shāh is generally written Sāhi, with a dental sibilant and a final i.

e. This is either the original, or a Sanskrit form, of the name of Agrā, the merchants or banyās of which place are well known all over India as the Agarwālā banyās.

f. The u of this word is long in this place, but in the two subsequent stanzas it is short, according in the three different places to the exigencies of the metre ; what its true sound is, is not ascertainable.

g. The numerical value of the words being equal to 1384—thus ; Veda = 4, Vashu = 8, fire = 3, and moon = 1.

h. No Sanskrit Dictionary gives this word. It evidently stands here for a province or a district. Perhaps it is a mislection of *pratigata* "in front of."

स्वस्ति ॥ सर्वभोग्यफलं यस्य पदाराधनतत्पराः ।
 लभन्ते मनुजान्ते गणाधिपतये नमः ॥ १ ॥
 सत्यलो नाम नः पातु साम्प्रवत्याम्बया सह ।
 प्रसादाद्यस्य देवस्य भक्ताः सुः सौख्यभाजनम् ॥ २ ॥
 देवेशि हरियानास्यः प्रियया स्वर्गसन्निभः ।
 द्विजिकाया पुरी तत्र तोमरैरसि निर्मिता ॥ ३ ॥
 तोमरानगरं यस्यां राज्यं निहतकण्डकं ।
 साधमाना नृपाश्चक्रुः प्रजापालनतत्पराः ॥ ४ ॥
 यैश्च प्रतापदहनदम्भारिकुलकाननः ।
 खेचः सहावदीनयां बलेनाजगृहे पुरीं ॥ ५ ॥
 ततः प्रवृत्ति भक्ता सा तुल्यैर्यावदस्य पूः ।
 जीमन्तमदराहिलां पानि सम्प्रति भूपतिः ॥ ६ ॥
 अपिच ॥ तस्यां पुर्यसि वशिजामघोतकनिवासिनां ।
 वंशः जीवावदेवाङ्गः साधुसचोदपद्यत ॥ ७ ॥

लक्ष्मीधरस्तनयोवभव लक्ष्मीधराङ्गिद्वयपद्मभङ्गः ।
 देवद्विजाराधननिष्ठचित्तः समस्तभूतावनलम्बकीर्तिः ॥ ८ ॥
 लक्ष्मीधरस्य तनयौ कलिकालवाङ्मावास्ताम्रौ मञ्जिमवारिनिधी सुकपौ ।
 माहाभिधो निपुणबुद्धिरभूतदायो वीकास्य उगतयशश्च नुजस्तु तस्य ॥ ९ ॥
 माहास्यस्याभवत्पुत्रो मेळानामा मनोहरः ।
 देवद्विजगुरुणां यः सदा राधनतत्परः ॥ १० ॥
 श्रीधरस्यात्मजां वीरोनाम्नीं भर्तृपरायणां ।
 वीकाविवाहयामास तस्यामास्ताम्रौ सुतौ ॥ ११ ॥
 ज्येष्ठस्तयोः खेतलनामधेयः साधुत्वपाद्यो धिरनन्मशीलः ।
 पौत्रकनामा च लघुः समस्तगुणद्विजाराधनशीलचित्तः ॥ १२ ॥
 अथैतयोः खेतलपौत्रकाष्टपाध्वोः सदाकीर्तनकर्मबुद्धौ ।
 इयं शुभासारवलाभिधानप्रामाण्यभूध्वसम्पन्न चित्ते ॥ १३ ॥
 पिढृणामर्चयं स्वर्गप्राप्तिरसन्मानदृढये ।
 खेतलः पौत्रकथैव कारयामासतुः प्रचिं ॥ १४ ॥
 वेदवस्तुप्रिचन्द्राङ्कसङ्गुब्दे विक्रमाङ्कितः ।
 पञ्चम्यां फाल्गुनसिते लिखितं भौमवासरे ॥ १५ ॥
 इन्द्रप्रस्थप्रतिगणे ग्रामे सारवलेच तु ।
 चिरं तिष्ठतु कूपोयं कारकश्च सवात्मवः ॥ १६ ॥
 संवत् १९८४ फाल्गुनशुद्धि ५ भौमदिने ॥

2. Inscription from Na'da'yana, near Indraprastha.

1. Prosperity ! He, (Ganes'a), who is known as the destroyer of every evil in behalf of those who seek his protection ; who bestows every favour to those who adore him with salutation ; who is the remover of misfortune—bears one prominent tooth like a crystal staff for the destruction of the enemies of the gods.

2. May Chaṇḍiká, who overthrows the enemies of the Lord of the Devas ; who sits on the shoulder of the buffalo giant ; who is bepraised by Hari, I'sa, and the Lotus-born, for success of every kind ; who quickly bestows rewards to mankind ; who upholds the universe ; who is the protectress of my family ; may she prove destructive to the sins of this world !

3. There is a great and virtuous province named Hariyána, where Krishna, along with Pártha, careered for the suppression of sin.

4. Therein exists the city of Dhilli, embellished with innumerable jewels, whence sin is expelled by the recitation of the Vedas by the knowers of the Ś'rúti, and which is resonant with the music issuing from the tinkling of anklet-ornaments of charming damsels, even as the river of heaven is with the voice of geese.

5. There was born the renowned Mahammad Sáhi, the crowning jewel of all earthly lords, the vigour of whose arms had overthrown all enemies ; the institutor of a new era ; the mighty. When he proceeds on hunting excursions, through fear the earth trembles, the ocean dries up, the mountains shake, and his enemies fly to distant quarters.

6. Lineage described. There lived formerly in the village of Náda'yana a merchant of the name of Govinda Deva and his family, all performing many virtuous acts, and were the glory (lit. standard) of the Rohitaka race.

7. Unto Govinda Deva was born a clever son named Ratna, even as a jewel is produced from the ocean. By him the auspicious and constant Gaganás'ri was taken for wife.

8. She bore unto him four renowned sons, the Ratnasádhus. These were Gangádharma, Mádhava, Lakshmana, and Dámodara.

9. The youngest among them, Dámodara, having married the beloved Virodá, obtained the auspicious Dhíra Deva, Krishna Deva, and other sons to the number nine.

10. Among them Dhíra Deva, the intelligent and knowing, was possessed of every accomplishment, well versed in mercantile work, in buying and selling, and an excellent judge of the qualities of cattle, land, gold, stuffs and jewelry.

11. He married a noble and auspicious lady named Dháni. By her he had two sons, Risađa and Sudeva.

12. Risađa had two goodly sons by his wife Rájásri, namely, Dullabha Deva and S'rikara.

13. The intelligent S'rikara was well versed in the law, and devoted to the worship of the lotus-like feet of the lord of Sri (Vishnu). He had two wives of good parentage, Kallyá and Gangadis'ri.

14. By them he got three accomplished and excellent sons: Prithvidhara by the eldest virtuous lady, and S'ridhara and Solhana by the younger.

15. To the west of Indraprastha there is a village named Náđáyana. To the north of this village a well was caused to be excavated by S'ridhara for the gratification of his parents.

16. "Is this the water of the celestial river, cool, sweet, and wholesome? or is it nectar thrown here by the immortals?" Thus exclaims the traveller when he proceeds home after drinking the sweet clear water of this well.

17. Written by Mádana Deva in the year four, eight, fire and moon, (a) of the era of Vikrama. On Thursday the 3rd of the wano in the month of Bhádra.

Samvat 1384, on the 3rd of the wano in the month of Bhádra, Thursday. May good happen of this!

(a) Fire equal to 3, and moon equal to 1. The figures, being transposed according to the usual practice in such cases, give the date 1884.

खसि ॥ सुतः प्रणतदेहिनां निखिलविघ्नविघ्नसंघ-
 न्नमज्जनसमोहितं वितरतीह यः पूजितः ।
 प्रधारयति विघ्नो रदनमेकमनुग्रहं
 प्रभेतुमिव नाकिनां स्फटिकदण्डमुग्रं दिवः ॥ १ ॥
 सुरेन्द्ररिपुमर्दिनीमहिषघाटिकासंक्षिता
 हरीशकमलोल्लसैरखिलसिद्धिहेतोः सुता ।
 भवेत् सकुलदेवता भवदेषोषविहितये
 नुतं जनफलप्रदा भुवनधारिणी चखिका ॥ २ ॥
 हरियानकसंज्ञोसि देशः पुष्पतनो मङ्गलम् ।
 ह्यः सपार्थो व्यचरयन् पापविशानये ॥ ३ ॥
 तस्मिन्नियं निखिलरत्नचयेपगूढा
 वेदसमैः प्रतिविदां सुतपापपुञ्जा ।

ढिकीपुटी सुरनदीव विभाति रम्या
 रम्याङ्गनाचरचनूपुरचंसमन्त्रैः
 नवाभूषणमन्त्रादिरक्षितयोरीशचूडामणि-
 विष्णोतो निजवाङ्मयोर्यदक्षितारातिः शक्रेन्द्रो बली ।
 चासाङ्गुललीह यस्य जगयात्रीडावर्णो गच्छतः
 सिन्धुः श्रुयति कम्पमाश्रु हि दिभ्योयान्मयद्रयोपि द्विवः ॥ ५ ॥
 वंशकथनं ॥ आसीद्विश्ववन्धुपरिहतः प्राङ् नाडायक्षामक्षताधिवासः ।
 गोविन्ददेवो बहुपुण्यकर्मदशोच रोचोतकवशकेतुः ॥ ६ ॥
 तन्मूर्तुगुणवान् जज्ञे रत्नो रत्नमिवान्मुधेः ।
 येनोढा धर्मिणा पत्नी गगनात्री पतिव्रता ॥ ७ ॥
 तस्यामजायन्ता सुताः प्रसिद्धाश्चत्वार एते किल रत्नसाधोः ।
 गङ्गाधरो माधवलक्ष्मणाख्यावन्त्यसु दामोदरनामधेयः ॥ ८ ॥
 लघुर्दामोदरलोषा विरदां प्राप्य सुप्रियां ।
 श्रीधीरदेवकल्यादींस्तनयांस्तन्मवाग्नव ॥ ९ ॥
 तेषामभूत्सर्वकलासमिज्ञो वाणिज्यकर्माजयविक्रयज्ञः ।
 गोभूमिचैमान्वररत्नविज्ञः श्रीधीरदेवो मतिमान् गुणज्ञः ॥ १० ॥
 तेनोद्गाह्य श्रुतां पत्नीं धन्यां धानीतिविभुतां ।
 द्वावङ्गौ रीसडाख्यसुदेवौ जनिताविभौ ॥ ११ ॥
 राजत्रियां नामपत्न्यां रीसडः सत्युताविभौ ।
 लेभे दुर्लभदेवाङ्गं श्रीकरं च ततः परं ॥ १२ ॥
 श्रीश्रीकरः श्रीवरपादपद्मसंनेवज्ज्ञो मतिमान् विचित्रः ।
 सहस्रजज्ञौ लभतस्तु कानो कल्याभिधानीमथमंगदित्रीं ॥ १३ ॥
 श्रीश्रीकरस्यैव कलासुदक्षाः पुत्रास्तयोमी गुणिनो बभूवुः ।
 श्रुत्योधरो व्येष्टपतिव्रतायां जातोपरौ श्रीधरवेङ्कणख्यौ ॥ १४ ॥
 इन्द्रप्रस्थादावष्टे दिग्विभागे धामः स्थातोप्यसि नाडायक्षाः ।
 धामादस्मादिशुदीक्षां पिबृणां ऋतैः कूपः कारितः श्रीधरेण ॥ १५ ॥
 किमु सुरसरिदम्भः श्रीतल्लं मिष्टमिष्टं किमिह तदमरैर्वा चित्रमवाच्यतं यत् ।
 इति पथिकसमूहस्य कूपस्य पीत्वा मधुरमुदकमन्त्रं प्रस्तुवन् याति मे चमः ॥ १६ ॥
 छतिर्मन्ददेवस्य तुय्योद्याग्निनिष्ठाकरे ।
 विभ्रमाब्देऽसिते भात्रे ऋतोयायां गुरोर्दिने ॥ १७ ॥
 संवत् १९८४ मिति भाद्रपदि ९ गुरुदिने शुभं भवतु ॥

Regarding these two inscriptions, Mr. Delmerick writes as follows :—

'By to-day's post I beg to forward for translation and publication copies of inscriptions on a couple of stone slabs now in the Delhi Museum.

'They have been carefully transcribed by Bisashar Nath, a learned Pandit and teacher of Sanskrit in a school in the city.

'The Nárāina stone was given to me by Lalla Omra Singh, a member of the Delhi Municipality, and by me deposited in the museum. The inscription on it is in very good preservation.

'I cannot ascertain how the Sarban stone found its way into the museum. It has been there for several years, and the inscription on it is very much abraded and cut up, and the Pundit has had a great deal of trouble in decyphering it.

'When these stones were originally set up, Naraina was, as you will perceive, called *Narain*, and Sarban *Sarbal*. Delhi was also *then* known as Dhilli, and not Dehli and Dilli as *now* written and pronounced.

'The two wells to which these inscriptions relate appear to have been built by *bánias*—and members of the same family within six months of each other, and during the reign of Muhammad-bin Tughluq in the Samvat year 1384, or A. D. 1327.

'Naráina is 7 miles S. W. of Delhi, and Sarban is 5 miles south of Delhi. The two villages are six miles apart from each other.

The following papers were read—

1. *On the Genera Murina and Harpyiocephalus of Gray*,—By G. E. DOBSON, B. A., M. B., *Staff Surgeon H. M's British Forces*.

The Genus *Murina* was formed, in 1842, by Dr. J. E. Gray for the reception of *Vespertilio suillus*, Temm. which was shown to possess characters generically distinct from other species of Chiroptera, and later *Vespertilio harpia*, Pallas, was made the type of a new genus *Harpyiocephalus* by the same author.

These species remained the sole representatives of their respective genera till last year when two new species of *Murina* were added—*M. grisea*, Hutton, and *M. cyclotis*, Dobson,—and a second species of *Harpyiocephalus*, from the North-Western Himalaya was described by Dr. W. Peters under the name of *H. Huttoni*.

The genus *Harpyiocephalus* is distinguished from *Murina* according to • Dr. Gray* by having the wing-membrane attached to the base of the toes while in the latter genus it extends along the toe as far as the base of the claw; also by the hairiness of the feet and interfemoral membrane, and by the possession, in adults, of a single premolar only, in the upper jaw.

I lately described a new species of *Murina*—*M. cyclotis*—which presents characters peculiar to both genera as given by Dr. Gray. It so resembles *Harpyiocephalus harpia*, Pallas, in the peculiar form of the nostrils, and the distribution, quality and even colour of the fur as to appear on a superficial examination to be an immature specimen of that species. But while thus agreeing generally with *H. harpia*, it differs in having the wing membrane attached to the base of the claws instead of to the base of the toes, and so belongs equally to both genera. This convinced me that the distinctions enumerated by Dr. Gray were not sufficient to separate these species

* Synopsis of the genera of *Vespertilionidæ* and *Noctilionidæ*; *Ann. and Mag. Nat. Hist.* 1866, p. 66.

into different genera, and as the name '*Murina*' had the priority of *Harpyiocephalus* I placed the new species in the former genus.

I was obliged to defer publishing these remarks till I should have had an opportunity of examining skeletons of both species. Meanwhile I received Dr. Peters's paper with descriptions of two of the species referred to above in which he adds that it is scarcely possible any longer to maintain *Harpyiocephalus* and *Murina* as distinct genera; he does not, however, unite them, probably for the same reason.

An examination of the skeletons of *Murina cyclotis*, and *Harpyiocephalus harpia* has confirmed the opinion previously formed of their affinity. The chief differences are to be found in the skulls, the remaining parts of the skeletons of both species corresponding in all respects.

Compared with *M. cyclotis*, the skull of *H. harpia* is much shortened in front of the anterior origin of the zygoma, the distance between the infra-orbital foramen and the inner incisor being the same in both skulls, though their respective lengths are as 10 : 12. This shortness of the muzzle in *H. harpia* diminishes the length of the tooth-row and leaves no room for the third molar which is constantly absent in adult animals, probably pushed out by the growth of the other teeth. These might be regarded as important differences, were it not that two authors have mentioned the presence of an additional tooth in the young animal, and in Dr. Peters's description of *H. Huttonii*, a third molar is referred to.

The mandible of *H. harpia* is also, correspondingly shortened, and the teeth are crowded between the canine and the anterior edge of the coronoid process; the third molar is much smaller than the second, and being placed on the commencement of the ascending ramus is elevated by its longest cusp above the others.

The teeth in *M. cyclotis* are very similar to those in *H. harpia*, both upper premolars are large and bear about the same proportion to the canines and molars as they do in that species, agreeing in this respect with *M. grisea*, lately described by Dr. Peters,* but differing remarkably from *M. stillus* in which the first upper premolar is much smaller than the second which equals the canine in vertical extent.

In *H. harpia*, the skull is proportionately more swollen and elevated between the centres of the zygomatic arches than in *M. cyclotis*, and the sagittal crest much more developed; the bases of the skulls are very similar, the only difference observable being the greater backward prolongation of the palate bones behind the molar teeth in *H. harpia*, but this is perhaps more apparent than real as the absence of the third molar adds to the length.

The mandibles in both species have a striking generic resemblance in the elevation of the coronoid process above the condyle. In *H. harpia* the coronoid process is probably more developed than in any other species of bat, and its outer surface is deeply hollowed out for the insertion of muscles. Its shape is very similar to that of the common Dog, but proportionately to the length of the jaw it is much more developed. Corresponding to this great development of the coronoid process of the mandible, the teeth are very stout and thickly coated with enamel; the cusps of the molar are short and blunt and the canines much thickened, the small incisors even presenting the same peculiarity.

In *M. cyclotis*, the coronoid process is considerably elevated above the condyle, and its external surface is deeply hollowed, but its general form is triangular, not rounded as in the former species. The molars are stout and their cusps not so acute as in other species of *Vespertilionidæ*, resembling most those of *H. harpia*.

The peculiar form of the teeth of *H. harpia* is evidently connected with the nature of the food of the animal. The stout bluntly pointed teeth, well coated with enamel, are admirably adapted to crush the hard cases of coleoptera, especially of the larger kinds which a bat of the size of this species might be expected to capture. In the stomach of one examined by me the crushed cases of some species of these insects were found in abundance.

As we become better acquainted with the habits of these animals, it will probably be found that the food of this species is restricted to certain species of coleoptera possessing extremely hard cases which would effectually resist the feeble though more acutely pointed teeth of other bats inhabiting the same localities.

The form of the teeth, the great development of the coronoid process and shortness of the mandible, are all evidently subservient to the same object, and have become modified simultaneously to suit the food of the animal.

The teeth of the Asiatic and African Elephants differ much more remarkably than do the teeth of some species of bats belonging to very distinct families, and yet few zoologists venture to place them in different genera.

Professor Flower has well remarked that there is "too much importance attached to the characters of the teeth, their modifications depending on adaptation mainly, and not essentially indicative of affinity."*

The conjoined genera, united under the common name *Murina*, contain five species, enumerated above, of which *M. harpia* and *M. suillus* are most widely separated. These form a very natural group, readily distinguished from all other genera of *Vespertilionidæ* by the peculiarly shaped projecting nostrils taken in connection with the dental formulæ.

* Proc. Zool. Soc. Lond. 1869, p. 5.

Note.—In a short paper, containing notes on some species of *Chiroptera* collected by Mr. Theobald in Burma, published by me in the 'Proceedings' for August, 1872, I mentioned that I had obtained specimens of *Cynonycteris amplexicaudatus*, Geoff. from North-Western India.

I have since learned from Mr. W. T. Blanford, who sent me these specimens, that I have given a wrong locality for them, as they were taken by him in the Nemakdun Salt Caves, Kishnu Island, in the Persian Gulf.

The mistake in the locality, referred to above, was due to the label sent by Mr. Blanford having been misplaced after the receipt of the specimens.

In the Proceedings for December last I described a new species of *Vespertilio*, collected by Captain W. G. Murray in Kashmir, under the name of *V. macropus*. I discovered since, quite accidentally (as there is no copy of the "Mammals of Australia" in Calcutta,) that this name had been used for an Australian bat by Mr. Gould and consequently cannot be again employed. I propose, therefore, for this new species the name *Vespertilio longipes*.

2. On the Asiatic species of *Molossi*.—By G. E. DOBSON, B. A., M. B.

(Abstract.)

The paper commences with an account of the distribution of the species of this very remarkable and well defined group. The *Molossi* are divided into five genera, of which two only, *Nyctinomus* and *Chiromeles*, are found in the continent of Asia and its islands. By far the greater number of species belong to the genus *Molossus*, and are confined to the Western Hemisphere.

Two new species of *Nyctinomus* are described, one from Bengal and the Panjáb, *N. tragatus*, and one from China, *N. insignis*. The former resembles *N. plicatus*, Buch. Ham. very closely in size and in general aspect, but differs in possessing a much larger tragus, in the development of the ears, and in the place of attachment of the wing membrane; the latter, a large species, had been named by Mr. Blyth in his Catalogue of the Mammals in the Museum of the Asiatic Society, but not described.

The number of Asiatic species of *Molossi* described prior to 1873 were three, one *Chiromeles* and two *Nyctinomi*, and to these three more are added, making six the total number now known.

The paper will appear in the Journal.

3. On *Rhopalorhynchus Kröyeri*, a new genus and species of *Pycnogonida*.—By J. WOOD-MASON, Esq.

The paper will appear in Journal Part II, No. 3, 1873.

4. Note regarding certain type specimens of *Batrachia* in the Asiatic Society's Museum.—By W. THEOBALD, Esq.

The passage I wish to draw attention to in a paper of Dr. J. Anderson in the P. Z. S. of London for February, 1871, is the following: "It will be

observed that a number of Mr. Blyth's types of *Batrachia* in the Indian Museum have been identified. These are of peculiar interest, as Mr. Theobald was under the impression, when he drew up his Catalogue of the Reptiles in the Asiatic Society's Museum, that they had disappeared from the collection." On first being informed of this fact some time last year, I received the intimation with pleasure, thinking that I had been guilty of an oversight in the haste with which the Catalogue was compiled, but having recently had my attention re-drawn to the subject by Dr. J. E. Gray's repeated attacks on me, as regards the *Testudinata*, a full reply to which I am now preparing, I thought I would look into the "how and why" I came to overlook the above types, and the following is the result at which I have arrived, that whilst bearing full testimony to the patient research of Dr. Anderson, and the perfect fairness wherewith his remarks are written, I cannot but see there are some difficulties in the way of accepting his conclusion.

The first Batrachian type I was supposed to have overlooked, *Megalophrys gigas*, Blyth 71, is thus entered in Dr. Anderson's paper, and I cannot see how it is possible that Dr. Anderson can be right, but the facts are these.

"*RANA LIEBIGII*, Gunther.

Megalophrys gigas, Blyth, Jour. As. Soc. Beng. XX p. 410, XIII p. 299, and XXIV p. 717.

Rana Liebigii, Gth. p. 38, 1860 p. 157 pt. 28, fig. A.

Hylorana erythraea, Schlegel, Theobald Cat. Rep. As. Soc. Museum p. 84 (J. A. S. XIII *supra* is a typographical error for XXIII)."

Now the object I had in view in preparing the Catalogue was quite distinct from the far more laborious one subsequently carried out by Dr. Anderson, namely, a critical examination of each individual specimen, and was mainly to record the number and names of specimens in the As. Soc. Museum at the time, as they stood recorded, recently in Mr. Blyth's own handwriting, on the labels attached to the bottles. As Mr. Blyth had described two species of *Megalophrys*, as among presentations to the Museum, I entered both species with references in the Catalogue, but as I could discover no specimens of the genus in the Museum, nor any specimens having that name on their label, I presumed that they had been lost. Doubtless what did take place, with respect to the species claimed as re-discovered by Dr. Anderson, was that Mr. Blyth, being satisfied it was no *Megalophrys*, removed the label. There is, however, a difficulty in accepting Dr. Anderson's identification which has not been explained or alluded to. As a matter of fact, the specimen which Dr. Anderson considers he has identified as the type of *Megalophrys Gigas*, was presented by Capt. W. S. Sherwill from Sikkim, and was an adult male; whilst the specimen identified as the above type under *Hylorana erythraea* in my Catalogue was labelled in Blyth's handwriting as presented by Major Berdmore from Mergui, and is moreover a

large female ! a fact corroborated by Dr. Anderson in re-examining the specimen. As stated by me the specimen was really labelled by Blyth *nigrovittatus*, which I have ranked as a synonym of *ERYTHRÆUS*, and was the type of that species.

The next species to which I would advert is *Diplopelma Berdmorei*, Blyth, which Dr. Anderson charges me with confounding with *D. pulchrum*, Gth. Now *Dip. Berdmorei* is one of the commonest and best marked frogs in Pegu, and I am perfectly familiar with it ; yet Dr. Anderson had full warrant for what he said, for by a ridiculous typographical blunder *Dip. Berdmorei* is printed in italics, as though a synonym of the preceding species, the name of which, being an Indian frog is entered by me according to my plan, though no specimens were in the Museum. Though Dr. Anderson was really mistaken in this matter, he was fully justified in what he said so far, but I am not convinced that his recognition of the types said to be missing is correct. *Dip. Berdmorei* is subject to very little variation in colour or size, and it is more likely than not, that among four specimens from any part of Burnah he could find one which "accurately agrees with Blyth's measurements." As a matter of fact, however, the 4 bleached specimens catalogued by me, were labelled as presented by Col. Phayre from Arakan, whilst the type of "*Engystoma Berdmorei*, J. A. S. XXIV p. 720, was presented by Capt. Berdmore from Schwe Gyen. I cannot therefore hold that the authority of an original label can be superseded on the grounds of an accidental agreement or measurement in a frog subject to such slight variation as that in question. I am not aware if I am supposed to have overlooked any other types than the above, which it appears in the last degree questionable if I really did overlook, but I merely bring forward the subject in order that so curious an error of so accurate an observer as Dr. Anderson should not be perpetuated, to the bewilderment of whoever may hereafter desire to examine Mr. Blyth's types.

Dr. Stoliczka regretted that Dr. Anderson was not present to explain the mistake complained of by Mr. Theobald. He said that though he had in this case little doubt about the correctness of Dr. Anderson's specific identifications, still a mistake about Blyth's typical specimens might have occurred, unless specimens from different localities, but belonging to the same species, had been put together in the same bottle with the type specimens. In such cases one could really do no more than select that specimen as the type, which precisely agreed with the original description.

5. *A Contribution towards a Monograph of the Passalidæ.*—By DR. F. STOLICZKA.

(Abstract.)

The author said that his object in examining the Indian representatives of this family was chiefly to test the views expressed by Dr. Kaup

regarding their classification in a recent Monograph of the *Passalida*. The present communication is only preliminary to a more extensive monograph, but the author thought it desirable to put on record the results which he had at present obtained, because he was shortly to proceed with the expedition to Central Asia, which might last for nearly two years.

There are 29 species enumerated in the paper. Regarding several of the known ones, notes on distribution, etc., are given, and eight species are described as new. All the species which are known to occur in India, including Ceylon and Burma and the country extending southward to Singapore, have been noticed. The arrangement of the groups and genera adopted by Kaup in his recent monograph has been followed. The paper will be published in the third number of the Journal.

The author did not claim to be a supporter of the views of the philosophical school of naturalists, but he spoke in a few general terms on the principles of classification, adopted by Dr. Kaup, a classification of which Dr. Kaup may almost be called the originator, and of which he certainly is the most important representative and the greatest supporter. The principle which the philosophical school, as represented by Kaup, adopts, is briefly the following. The naturalists say that we have to arrange our zoological specimens according to three heads—first, according to the anatomical system; secondly, according to the organ of sense; thirdly, according to the different parts of the body; these being the three chief constituents which make the animal what it is. Arranging the different components of each of these according to their value we obtain the following table.

	<i>A. Anat. system.</i>	<i>B. Sense.</i>	<i>C. Part of body.</i>
I.	nervous	eye	head.
II.	respiratory	ear	chest.
III.	osseous	nose	rump.
IV.	muscular	tongue	belly.
V.	dermal	sex	sacral region.

Now, to give an example—the class of animals in which the nervous system, the eye and the head, in proportion to the body, become most highly developed is undoubtedly the *Mammalia*. In the same way we get for number II. the *birds*, as the type of respiration-animals, the third the *Reptiles* (with the *Amphibians*), including the most voluminous forms, the fourth the *Fishes* with the belly most developed, and the fifth the *Mollusca*. These five classes are regarded as the members of the first sub-kingdom. The addition of the Mollusca to the other four does not look a very fortunate one, and it would be perhaps more appropriate to separate the Amphibians from the true Reptilians, as they are in reality two entirely different classes. Again it does look very strange that in the fifth division the sexual system is entered as corresponding to the eye and ear, and it is not apparent why

the sacral region should be the most developed part of the body in the Mollusca.

The general plan exhibited in the above table is, however, followed by Dr. Kaup through all the five sub-kingdoms. Thus, he places—and I think rightly—the *Psittacidæ*, as the most highly organised of birds, in the first family of the five tribes into which the birds are divided. On the same principle the *Brevipennes* with the *Dinornidæ* form the centre of the third tribe, and the *Gallinacæ*, which are the most stupid birds, take the lowest position. Among Reptilians the *Chameleontidæ* are the highest, and the *Dinosaurii* the largest; the former belonging to the first, the latter to the third tribe.

The above table is thus applied to every group, and is carried into the greatest detail in the *Passalidæ*. The largest known form, *Proculus Goryi*, is considered as the centre of the family, which is separated into *Aulacocyclinæ*, *Eriocneminaæ*, *Proculinæ*, *Neleinaæ*, *Passalinæ*. Dr. Kaup complains, that naturalists very often mistake analogies for affinities. Nature, he says, does not like affinities, but dissimilarities, and consequently in a natural arrangement not the species following each other, but always the next following is affined to the preceding. Each genus of the *Passalidæ* is thus divided into five species, of which the first is small and most convex, the second smallest and most depressed, the third the largest, the fourth smaller and the fifth the next largest. This system is carried out in a really most wonderful way, and the exceptions to it are apparently very few. Only in one instance, in the genus *Basilianus*, has the author described seven species, but these form two different groups, which are, however, by Kaup himself regarded as belonging to the same genus. In *Leptaularax* one species is added, but another which Dr. Kaup adopts, is believed to be merely a synonym. This new law of development, or whatever it may be called, is believed by its originator to be the greatest discovery which systematic zoology has made. We must leave it to time and research, which will no doubt tell us the real value of this practical philosophic idea. In the present instance the author thought it only desirable to bring the rudiments of the system, as stated by Dr. Kaup, before the members of the Society, and expressed a hope that somebody would give a little thought to it.

Speaking of recent suggestions, Dr. Stoliczka thought he might allude to one affecting the system of nomenclature in Zoology. All these suggestions, whether they become generally acknowledged or not, shew the direction in which the working zoological minds of men are at present occupied.

Professor Harting in Utrecht has recently drawn the attention of zoologists to the unsatisfactory conditions under which zoological nomenclature labours. The number of names is becoming so varied and so alarmingly large, that no human mind can remember these heterogeneous appellations.

A more rational nomenclature is, therefore, desirable, as an aid to the memory. This, Harting says, should be so constructed that any naturalist from hearing the name pronounced should immediately know to which group a certain animal belongs. His suggestion is to the effect that all the higher divisions should terminate in *res*. Now, for each of the five principal divisions of the animal kingdom, he takes one of the vowels, a, e, i, o, u, and thus we shall have—

I. <i>Vertebrata</i>	=	Ares	=	<i>Spondylozoa.</i>
II. <i>Articulata</i>	=	Eros	=	<i>Arthrozoa.</i>
III. <i>Mollusca</i> (or <i>Saccata</i>)	=	Iros	=	<i>Malacozoa.</i>
IV. <i>Radiata</i>	=	Orea	=	<i>Actinozoa.</i>
V. <i>Coelenterata</i>	=	Ures	=	<i>Amorphozoa.</i>

Taking No. I, as an example, he proposes to prefix the term *ares* with different consonants, in order to form names for the sub-divisions, thus—

<i>Mammalia</i>	=	Pares.
<i>Ares</i>	=	Cares.
<i>Reptilia</i>	=	Fares.
<i>Pisces</i>	=	Sares.

Retaining the *Pares* as a further example, Harting proceeds further to divide them thus:

<i>Placentalia</i>	=	Plares.
<i>Didelphia</i>	=	Prares.
<i>Erpetodelphia</i>	=	Psares.

Then the *Placentalia* or *Plares* are sub-divided:

<i>Binana</i> or <i>Hominidæ</i>	=	Amplares.
<i>Quadrumana</i>	=	Acplares.
<i>Chiroptera</i>	=	Atchphares.
<i>Carnivora</i>	=	Asplares.
<i>Rodentia</i>	=	Arplares.

As a further example of the system proposed, the *Arplares* or *Rodentia* are taken, and divided thus into:

<i>Sciurina</i>	=	Larplares.
<i>Castorina</i>	=	Carplares.
<i>Arvicolina</i>	=	Sarplares.
		etc.

Then the *Sciurina* or *Larplares* are divided into a certain number of genera for which the termination *a*, as indicating a mammal should be adopted (*e*, in case of birds, etc). * Thus we get:

<i>Sciurus</i>	=	Sciularpla.
<i>Pteromys</i>	=	Pterolarpla.
<i>Spermophilus</i>	=	Spermolarpla.
<i>Arctomys</i>	=	Arctolarpla.
<i>Tamias</i>	=	Tamolarpla.
<i>Myonius</i>	=	Myolarpla.

No generic name should exceed five syllables.

This system would of course answer admirably if we could calculate mathematically the number of existing genera and species, or if our science were concluded and not undergoing a constant change; but as these conditions do not obtain, it is not likely that the system will find many supporters. Still the suggestion has thrown been out, and discussion on the subject has been invited, because it is a very important one, and because the want of regulating our nomenclature in some way or other is generally felt.

Mr. Phear did not pretend fully to apprehend Kaup's system, but he would ask Dr. Stoliczka, whether the method of separating species by reference to THREE cardinal characteristics each taken out of a set of five, did not of itself immediately lead to the grouping of species also in sets of five. Each single set of five species might of course be defined as constituting a genus; or a definition of genus might be made in reference to the same characters such as would lead to the like result. But he confessed that he could not understand how in any other than some such way as this, any principle of arrangement deserving to be called a natural principle could bring about such very artificial looking classes, as Dr. Stoliczka mentioned.

In reply to Mr. Phear's observation Dr. Stoliczka stated that the number *five* selected by Dr. Kaup is, according to him, by no means arbitrary. It is dictated by the five anatomical systems, etc.. Any other larger or smaller number would of course not suit the theory. The classificatory number *five* is an old one, chiefly introduced by Oken, and Swainson used it in Ornithology. As regards the second point, Kaup's answer is decided. He says, for instance, that anybody who has thoroughly understood his reasoning, will see that a larger form of *PASSALIDÆ* than *Proculus Joryi* cannot exist. In the same way he states that a sixth species in the same genus cannot exist, if it be really a good species, and not a variety of either of the other five. Should anybody find a sixth species in one genus, and should there be no mistake in the generic definition itself, the system would of course be invalidated. Kaup says that he would be the first to give it up, if really convinced of the fact. The system itself, of course, requires improvements, probably alterations in the minor arrangement, which may be suggested by the discovery of new species. There can be no doubt, Dr. Stoliczka said, that Kaup's definitions of the genera and species are on the whole wonderfully correct. It is very difficult to find a single mistake, and if anybody come to the conclusion that he has discovered one, he will do well to revise his materials repeatedly, before he puts forth his statement as final. Dr. Stoliczka said he was speaking from experience in throwing out this suggestion.

Mr. Blanford said that from Dr. Stoliczka's account of Dr. Kaup's theory, it appeared to him to be a retrograde attempt. • "The great value of Darwin's theory is, that it had rendered Natural History a Science of causes

and effects, and had taught modern naturalists to regard classification as true only when it is based upon those affinities which result from community of evolution. A true classification therefore on this view is to be regarded as the final result of the science, and is to be patiently worked out by studying the causes that have determined it. Dr. Kaup's system sweeps away all this, and seeks to impose in its stead, an arbitrary Procrustean plan of creation, fanciful and mystical to the last degree. It is allowable and even beneficial in the early days of a Science to adopt an artificial classification of objects, since any arrangement is better than none. But to seek to impose such a system on the Zoology of the present day, and to sort and manipulate species and genera to make them succumb to an *a priori* hypothesis, appears to be an attempt to set up as a leading principle of science the maxim "*Si les faits ne s'accordent pas avec ma théorie, tant pis pour les faits.*"

Dr. Stoliczka, in reply, expressed his astonishment at Mr. Blanford's unjustifiable remarks. He said that that was not the way to treat mental productions. Dr. Kaup was an old naturalist of very high standing, and his system, as proposed, was by no means a fanciful one; it was based upon those characters of organisation which make the animal what it is—and that was no fancy. Philosophic systems had from time immemorial occupied the greatest minds, and not fancies. Dr. Kaup had not only not thrown out a suggestion of a fanciful arrangement, but he had given his system a definite form, he had established rules, he considered that he had found the law according to which nature works in development, and that only according to this could the animals exist. He had given a fair test to his system in working out one group of animals in the most minutely detailed manner, and he asked the scientific world for an opinion, whether he had succeeded in this or not; he wished to be disproved, if wrong. Now, how unfair it would be, if all this mental work were to be rejected with phrases. We required first of all *facts*, not *words* or *ideas*. Dr. Kaup's definitions of genera and species were not made up in the first instance according to a fanciful scheme, they were drawn from the animals themselves. Careful *observations* and *facts* were the ground on which we must in the first instance meet Kaup. Philosophic treatment of the facts must follow, in order to so meet the genial naturalist.

Dr. Stoliczka said he had taken up the study of the *Passalidæ*, because he wished to test Kaup's conclusions on his own materials, and because he thought it *a priori* almost impossible that a really natural classification would be obtainable in the way suggested by Kaup. After devoting some time to this subject—certainly only with scanty materials—he must express his grave doubts as to the validity of the system in the form at present proposed by Kaup; but he would be sorry to have spoken, if he had said that the system was really invalidated by his researches. He was not prepared to say that.

Such an elaborate system as this had full claim to be heard on the *audi alteram partem* principle; we must not presume that it was wrong, because it was so very simple. People very often overlook things nearest them. Hasty conclusions would, in this instance particularly, be absolutely of no value at all.

6. *Notes on some Andamanese and Nicobarese Reptiles.*—

By DR. F. STOLICZKA.

(Abstract.)

After a few general remarks relating to the distribution of certain Reptiles on these islands, the author gives a detailed description of *Phelsuma Andamanense*, of a new *Gymnodactylus* from Preparis Island, of a new *Mococa* from South Andaman, and of a new *Tiaris* from the island of Tillangchang. He exhibited a male and female of the remarkable little snake *Typhloscincus Nicobaricus* which is shewn to be a *Dibamus*, the males of which have hind-limbs while the females have none, thus confirming an opinion, which was some time ago put forth by Prof. Schlegel.

Mr. G. E. Dobson exhibited and presented to the Society's album photographs of a mosque at Tribeni near Hughli taken by him in December last.

The place was described by Mr. D. Money in the XVth Vol. of the Society's Journal, and its Muhammadan antiquities by Mr. Blochmann in the XXXIXth Vol. part I, p. 280, for 1870.

Also the following photographs of the aboriginal inhabitants of the Southern Andaman Island, taken by him, with Mr. T. R. Lewis's assistance, when at Port Blair last year.

No. 1. A photograph of the Chief of one of the tribes in the vicinity of Port Blair and his wife, with necklace of finger and toe bones of her an-

No. 2. Photograph of the same individuals standing.

No. 3. Photograph of a woman from Rutland Island.

No. 4. Group of five young Andamanese women.

No. 5. Group of Andamanese men and women. Widow in centre with skull of her deceased husband.

The receipt of the following communications was announced—

1. Notes and translation of General Cunningham's inscriptions from Behar.—By Bábu Pratápa Chandra Ghosha.

2. Metrical Translations from Chand.—By F. S. Growse, Esq., M. A.

3. Note on the genus *Gymnops*.—By W. T. Blanford, F. G. S., C. M. Z. S.

4. •On *Aquila bifasciata* and *Aquila orientalis*.—By W. E. Brooks, Esq. C. E.

5. Algæ collected by Mr. Kurz in Burma and Arrakan, determined by Dr. Zeller, High Councillor of Finance in Stuttgart.

6. Descriptions of two new species of Indian land-shells.—By Dr. F. Stoliczka.

LIBRARY.

The following additions have been made to the Library since the Meeting held in March last.

Presentations.

* * Names of Donors in Capitals.

Bulletin, Fevrier, 1873.

L'Abbé Desgodins.—Mots principaux des langues de certaines tribus qui habitent les bords du Lan-tsang kiang, du Lou-tze-kiang, et de l'Irrawaddy. *Francis Garnier.*—Navigation du Yang-tse-kiang. *Legrand de la Liraye.*—Expédition du Bourayne.

Delaporte.—Le Tong-King. La Chaîne des Garos. Les Louchâis. Lettre du Japon. Explorations Russes dans l'Asie Centrale.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Instructions for testing Telegraph Lines and technical arrangements in office, by L. Schwendler, Part II, Section I.

THE AUTHOR.

Pratna Kamra Nandini, Vol. V, Nos IX-XII.

THE EDITOR.

The Calcutta Journal of Medicine, Nol. VI, Nos. 1-2.

THE EDITOR.

The Christian Spectator, Vol. VI, No. 26.

THE EDITOR.

The Flora Sylvatica, Parts XV and XVI.

THE GOVERNMENT OF INDIA.

Report of the Charitable Dispensaries under the Government of Bengal for 1871.

Report on the Administration of the Income Tax in 1871-72.

The Proverbs of the inhabitants of the Chittagong Hill Tracts, by Capt. T. H. Lewin.

THE GOVERNMENT OF BENGAL.

General Report on the Revenue Survey operations of the Upper and Lower Provinces for 1871-72.

THE SUPERINTENDENTS OF THE REVENUE SURVEY.

Palæontologia Indica, Cretaceous Fauna of Southern India, Vol. IV. p. 3. *F. Stoliczka.*—The Echinodermata.

THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

Shaháb Sáqeb, by Maulavi Zil-lul-Karim.

HABIBAR RAHMÂN.

Exchange.

Nature, Nos 174-178.

Purchase

The Indian Antiquary, Part XVI.

G. H. Damant.—On the dialect of the Palis. *Dr. Bühler*.—Abhinanda the Gauda.
Rev. M. Phillips.—The Seven Pagodas. *Capt. J. S. F. Mackenzie*.—On the rules which
govern Kanarese Poetry. *P. M. Purnaiya*.—The Calendar of Tipu Sultan. Service
Tenures in Ceylon. Archæology of Maisur.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1873.*

Latitude 22° 35' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches	Inches	Inches	Inches.	o	o	o	o
1	29.827	29.912	29.731	0.181	88.7	94.7	76.0	18.7
2	.780	.818	.703	.145	83.6	92.5	76.0	16.5
3	.743	.821	.651	.170	84.0	91.0	78.5	15.5
4	.678	.749	.609	.110	84.6	93.8	78.0	15.6
5	.692	.752	.631	.121	83.0	87.0	80.2	6.8
6	.765	.846	.695	.151	82.9	89.7	77.5	12.2
7	.839	.901	.765	.136	80.5	87.3	76.6	10.7
8	.837	.933	.762	.171	81.0	90.0	74.5	15.5
9	.780	.860	.692	.168	83.8	91.0	75.0	19.0
10	.726	.809	.654	.155	86.1	98.5	77.8	20.7
11	.619	.699	.522	.177	87.2	102.0	78.2	23.8
12	.661	.631	.494	.137	89.3	103.5	78.6	24.9
13	.609	.693	.551	.132	88.3	101.9	80.3	21.6
14	.616	.736	.585	.151	88.1	99.0	82.0	17.0
15	.653	.726	.594	.132	88.0	99.7	80.2	19.5
16	.716	.788	.663	.125	87.6	98.2	81.9	16.3
17	.751	.815	.694	.121	87.6	99.7	80.0	19.7
18	.787	.867	.712	.125	85.9	94.3	77.5	16.8
19	.862	.974	.787	.187	79.4	87.4	71.7	15.7
20	.838	.908	.773	.135	77.1	81.0	73.0	11.0
21	.783	.818	.714	.134	77.2	85.5	71.0	14.5
22	.735	.804	.650	.154	82.1	91.5	72.6	18.9
23	.732	.816	.654	.162	84.9	93.5	78.4	15.1
24	.762	.838	.658	.185	85.0	93.5	77.8	15.7
25	.754	.828	.661	.167	86.4	94.3	80.5	13.8
26	.715	.777	.634	.143	86.7	96.8	81.0	15.8
27	.697	.762	.615	.147	87.2	96.0	81.0	15.0
28	.694	.757	.608	.149	84.2	94.8	73.5	21.3
29	.729	.818	.665	.153	79.3	84.2	75.0	9.2
30	.692	.755	.599	.156	80.4	92.0	76.0	16.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surgeon General's Office, Calcutta,
in the month of April 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches	T. gr.	T. gr.	
1	76.8	6.9	72.0	11.7	.0776	8.30	3.77	0.69
2	77.1	6.5	72.5	11.1	.787	.14	.59	.70
3	78.5	5.5	71.6	9.4	.843	9.03	.14	.74
4	77.2	7.1	72.0	12.6	.776	8.28	4.11	.67
5	78.0	5.0	74.5	8.5	.810	9.01	2.81	.76
6	76.2	6.7	71.5	11.4	.763	8.20	3.59	.70
7	75.5	5.0	72.0	8.5	.776	.35	2.63	.76
8	75.4	5.6	71.5	9.5	.763	.21	.93	.74
9	77.6	6.2	73.3	10.5	.809	.65	3.45	.72
10	78.8	7.3	73.7	12.4	.819	.74	4.21	.68
11	79.7	7.5	75.2	12.0	.860	9.15	.22	.68
12	78.9	10.4	72.7	16.6	.792	8.38	5.83	.59
13	80.8	7.5	76.3	12.0	.890	9.46	4.34	.69
14	81.8	6.3	78.0	10.1	.940	.99	3.73	.73
15	81.4	6.6	77.4	10.6	.922	.79	.89	.72
16	80.6	7.0	76.4	11.2	.893	.51	4.01	.70
17	80.1	7.5	75.6	12.0	.871	.25	.27	.68
18	79.8	6.1	75.5	10.4	.868	.27	3.60	.72
19	74.9	4.5	71.7	7.7	.768	8.30	2.32	.78
20	73.5	3.6	71.0	6.1	.751	.15	1.77	.82
21	73.1	4.1	70.2	7.0	.732	7.94	2.01	.80
22	76.0	6.1	71.7	10.4	.768	8.26	3.25	.72
23	80.1	4.8	76.7	8.2	.902	9.61	2.85	.77
24	79.4	5.6	75.5	9.5	.868	.27	3.26	.74
25	80.2	6.2	75.9	10.5	.879	.36	.70	.72
26	80.4	6.3	76.6	10.1	.899	.56	.62	.73
27	81.2	6.0	77.6	9.6	.928	.87	.50	.74
28	78.5	5.7	74.5	9.7	.810	.00	.24	.74
29	75.1	4.2	72.2	7.1	.781	8.13	2.16	.80
30	76.6	3.8	73.9	6.5	.824	.88	.06	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of Barometre 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.745	29.870	29.560	0.310	80.1	83.5	72.7	10.8
1	.735	.853	.515	.308	79.8	83.2	72.4	10.8
2	.723	.841	.529	.312	79.3	82.8	71.8	11.0
3	.711	.826	.518	.308	79.0	82.4	71.5	10.9
4	.710	.838	.529	.309	78.6	82.0	71.3	10.7
5	.722	.851	.511	.307	78.4	82.2	71.0	11.2
6	.710	.876	.572	.304	78.2	82.0	71.0	11.0
7	.761	.957	.598	.359	78.8	82.5	71.5	11.0
8	.787	.974	.620	.354	81.0	85.0	72.0	13.0
9	.797	.938	.625	.313	83.9	88.0	73.1	14.9
10	.802	.912	.631	.311	86.6	91.7	75.6	16.1
11	.787	.922	.622	.300	88.9	95.5	76.7	18.8
Noon	.771	.892	.602	.290	90.8	98.5	76.3	22.2
1	.742	.881	.574	.307	92.2	100.6	80.0	20.6
2	.712	.857	.551	.306	93.0	102.5	80.5	22.0
3	.687	.849	.526	.323	92.7	103.4	74.7	28.7
4	.673	.835	.505	.330	91.6	103.5	73.2	30.3
5	.666	.825	.494	.331	89.7	102.0	75.0	27.0
6	.677	.851	.491	.357	86.8	97.5	73.5	24.0
7	.694	.833	.513	.320	84.5	93.0	75.0	18.0
8	.717	.816	.551	.292	82.7	88.4	74.5	13.9
9	.739	.861	.581	.280	81.8	86.7	74.0	12.7
10	.753	.878	.580	.298	81.1	85.4	74.5	10.9
11	.682	.873	.574	.299	80.4	84.6	73.0	11.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon — (Continued).

Hour.	Mean Wet Bulb Ther- moneter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	77.1	3.0	75.0	5.1	0.854	9.22	1.62	0.85
1	76.8	3.0	74.7	5.1	.843	.14	.61	.85
2	76.6	2.7	74.7	4.6	.816	.14	.45	.86
3	76.4	2.6	74.6	4.1	.813	.13	.37	.87
4	76.2	2.4	74.5	4.1	.810	.11	.27	.88
5	76.1	2.3	74.5	3.9	.810	.11	.20	.88
6	76.1	2.1	74.6	3.6	.813	.12	.13	.89
7	76.5	2.3	74.9	3.9	.851	.21	.23	.89
8	77.6	3.1	75.2	5.8	.860	.21	.90	.83
9	78.7	6.2	75.1	8.8	.857	.17	2.66	.76
10	79.4	7.2	75.1	11.5	.857	.12	4.62	.69
11	79.9	9.0	74.6	14.4	.840	8.92	5.12	.64
•								
Noon.	80.0	10.8	73.5	17.3	.814	.60	6.24	.57
1	80.4	11.8	73.3	18.9	.809	.50	.95	.55
2	80.6	12.4	73.2	19.8	.806	.40	7.35	.54
3	80.3	12.4	72.9	19.8	.797	.38	.30	.53
4	79.8	11.8	72.7	18.9	.792	.35	6.81	.55
5	79.1	10.6	72.7	17.0	.792	.38	5.99	.58
6	78.7	8.1	73.8	13.0	.822	.75	4.16	.66
7	78.3	6.2	74.0	10.5	.827	.81	3.51	.72
8	77.7	5.0	74.2	8.5	.832	.83	2.79	.76
9	77.8	4.0	75.0	6.8	.851	9.18	.22	.81
10	77.4	3.7	74.8	6.3	.849	.15	.02	.82
11	77.1	3.3	74.8	5.6	.849	.15	1.79	.84

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1873.*

Solar Radiation, Weather, &c.

Hour	Barometer inches	Thermometer in shade	Wind Prevailing direction.	Max. Pressure	Daily Velocity	General aspect of the Sky.
				inches	Miles	
	138.0		S by W & S		199.0	B to 2 A.M., \searrow to 4 A.M. B to 3 P.M., \searrow to 8 P.M. B to 11 P.M.
2	137.8		S & S by E		203.5	B to 5 A.M., \searrow to 11 P.M.
3	142.0		S by W & SSW		230.5	\searrow to 1 P.M., \searrow & \searrow to 11 P.M.
4	137.2		S S W & S	1.0	271.7	\searrow to 5 A.M., \searrow to 11 A.M., \searrow to 4 P.M., \searrow to 11 P.M.
5	120.0		S S W & S	2.5	287.4	O to 5 A.M. S to 7 P.M. O to 11 P.M.
6	129.0		S & S S W		179.2	O to 10 A.M. S to 6 P.M., \searrow to 11 P.M.
7	122.0		S by E & S	0.6	88.5	Chiefly O.
8	143.0		S S W & S by E		123.8	\searrow to 8 A.M. O to 12 A.M., \searrow to 7 P.M. B to 11 P.M.
	140.4		S by E, S by W & S		157.8	B to 6 A.M. \searrow to 10 A.M. B to 12 A.M., \searrow to 4 P.M., \searrow to 11 P.M. B
	143.5		S S W & S W		232.3	B.
	149.5		S W & S S W		262.1	B.
12	151.5		S S W & S W		245.2	B.
13	143.0		S W & S S W		154.2	Chiefly B.
14	145.7		S S W & S by W		221.0	Scuds to 9 A.M. B to 9 P.M. Scuds to 11 P.M.
15	145.3		S S W	0.2	220.1	Scuds to 8 A.M. B to 1 P.M., \searrow to 4 P.M. B to 8 P.M., \searrow to 11 P.M.
16	142.8		S S W & S		200.7	\searrow to 10 A.M. B to 11 P.M.
17	144.0		S W & S		200.3	Chiefly B.
18	143.6		S S W & S		258.3	Chiefly \searrow Brisk wind from 11 A.M. to 11 P.M. L at 10 & 11 P.M. D at 10 P.M.
19	115.2	0.20	S E & S S W	9.2	322.4	\searrow & \searrow to 6 A.M. O to 3 P.M. \searrow to 7 P.M., S to 11 P.M. High wind from 6 $\frac{1}{2}$ to 7 $\frac{1}{2}$ A.M. L at midnight and from 9 to 11 P.M. T at 6 $\frac{1}{2}$ and 7 $\frac{1}{2}$ A.M. Slight R from 6 $\frac{1}{2}$ to 9 A.M.
20	113.8	1.02	S S E & Variable.	0.8	135.8	S to 7 A.M., O and \searrow to 11 P.M. T and R from 11 A.M. to 4 P.M.

\searrow i Cirri, \searrow i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati, \searrow i Nimib,
 \searrow i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1873.*

Solar Radiation, Weather, &c.

	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	Wind.		Daily velocity	General aspect of the Sky.
			Prevailing direction.	Therm.		
	°	inches.		F.	Mile.	
21	132.0	0.15	N E & Variable.	0.5	185.7	☁ i to 1 A. M., O to 9 A. M., ☁ i to 5 P. M., B to 11 P. M. T at 3 A. M. L at 2 and 3 A. M. Slight R from 2 to 5 and at 8 A. M.
22	137.0		S	0.9	146.5	Chiefly B.
23	139.0		S S W & S	3.0	309.0	B to 7 A. M., Scuds and ☁ i to 1 P. M. B to 11 P. M. Brisk wind from 8 to 11½ A. M., L on Nat 8 P. M., D between 9 and 10 P. M.
24	140.2		S E & S	1.0	252.5	B to 7 A. M., ☁ i to 2 P. M., clouds of different kind to 11 P. M. L on N E between 7 and 8 P. M.
25	141.0	...	S by E & S by W	2.0	297.0	Clouds of different kinds. Brisk wind from 3½ to 6¾ P. M. L between 8 and 9 P. M.
26	145.5	...	S by E & S	2.3	275.5	Scuds to 4 A. M., ☁ i to 8 A. M., B to 3 P. M., ☁ i to 11 P. M. Brisk wind from 1½ to 8 P. M.
27	142.0	...	S S E. S & S by E	1.7	298.5	Scuds to 9 A. M., B to 11 P. M. Brisk wind from 2½ to 6 P. M., T at 6 P. M.
28	148.0	0.40	S & S by E	30.4	278.8	Scuds to 3 A. M., ☁ i to 8 A. M., ☁ i to 4 P. M., O to 11 P. M. Violent storm from 5½ to 6¾ P. M. T at 5, 6, 10 and 11 P. M. L from 6 to 11 P. M., R at 6 and between 10 and 11 P. M.
29	133.8	0.07	E	3.5	273.3	O to 12 A. M., clouds of different kinds to 11 P. M. High wind from 9½ to 10½ A. M., T at midnight, 1, 10½ A. M., and 2½ P. M. L at midnight. Slight R between midnight and 1 and 10 and 11 A. M.
30	142.7		S S E & E by S	2.9	151.3	B to 4 A. M., S to 8 A. M., ☁ i to 4 P. M., S to 9 P. M., B to 11 P. M. Brisk wind between 4½ and 5½ P. M., T from 4 to 6 P. M., D at 2½ and 4½ P. M.

☁ i Cirri, ☁ i Strati, ☁ i Cumuli, ☁ i Cirro-strati, ☁ i Cumulo-strati, ☁ i Nimbi, ☁ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surgeon General's Office, Calcutta,
in the month of April 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.733
Max. height of the Barometer occurred at 8 A. M. on the 19th ...	29.974
Min. height of the Barometer occurred at 5 & 6 P. M. on the 12th ...	29.404
Extreme range of the Barometer during the month	0.480
Mean of the daily Max. Pressures	29.809
Ditto ditto Min. ditto	29.658
Mean daily range of the Barometer during the month	0.151

Mean Dry Bulb Thermometer for the month	84.2
Max. Temperature occurred at 4 P. M. on the 12th	103.6
Min. Temperature occurred at 5 & 6 A. M. on the 21st	71.0
Extreme range of the Temperature during the month	32.5
Mean of the daily Max. Temperature	93.8
Ditto ditto Min. ditto,	77.3
Mean daily range of the Temperature during the month	16.5

Mean Wet Bulb Thermometer for the month	78.1
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.1
Computed Mean Dew-point for the month	73.8
Mean Dry Bulb Thermometer above computed mean Dew-point	10.4

	Inches.
Mean Elastic force of Vapour for the month	0.822

	Troy grain.
Mean Weight of Vapour for the month	8.80
Additional Weight of Vapour required for complete saturation ...	3.44
Mean degree of humidity for the month, complete saturation being unity	0.72

Mean Max. Solar radiation Thermometer for the month	138.3
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	Inches.
Rained 8 days.—Max. fall of rain during 24 hours	1.02
Total amount of rain during the month	1.84
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	1.58
Prevailing direction of the Wind	S. S. W & S.

* Height 70 feet 10 inches above ground.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JUNE, 1873.

The Monthly General Meeting of the Society was held on Wednesday, the 4th instant, at 9 P. M.

Col. H. Hyde, R. E., President, in the Chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced—

From the Trustees, Indian Museum, a set of the Minutes of the Trustees, Vols. I to V.

The following gentleman, duly proposed and seconded at the last meeting, was balloted for and elected an Ordinary Member—

J. W. Johnston, Esq., M. D., 4th P. I.

The following are candidates for ballot at the next meeting—

H. M. Durand, Esq., C. S., proposed by J. Wood-Mason, Esq., seconded by J. H. Rivett-Carnac, Esq., C. S.

Captain Fraser, 3rd Madras Cavalry, proposed by W. McLaren Smith, Esq., M. A., seconded by Captain J. Waterhouse.

C. V. Marshall, Esq., Berhampore, Moorshedabad, proposed by J. Wood-Mason, Esq., seconded by Captain J. Waterhouse.

Col. G. H. Saxton has intimated his desire to withdraw from the Society after the third quarter of the current year.

The President announced that Dr. Stoliczka having resigned the posts of Natural History Secretary and Member of Council on proceeding with the mission to Kashgar, the Council have appointed J. Wood-Mason, Esq., Natural History Secretary, and elected J. Westland, Esq., C. S., a Member of the Council, in place of Dr. Stoliczka.

The Secretary read the following extract of a letter from J. Beames, Esq., C. S.

"As some misapprehension seems to exist as to the nature of the task now being carried on in respect to Chand's poem, I beg to state as follows :

"I have undertaken merely to supervise the production of a printed text of Chand from a good and complete MS. I do not undertake to correct what seem to be errors in the MS., because when more is known about the poem, it may turn out that what we now think errors, are really correct.

"The object of the Society, I take it, is merely to put into the hands of scholars the poem itself as it stands. It is not now accessible to the public at large, because it is only in MS., but when it is in print, hundreds of scholars in various places can work at it, and their labours will, I hope, result eventually in a correct text. Many hundred years have elapsed since the text of Homer and Virgil were first put into print, yet scholars have not yet left off altering and improving the text. I think it would be almost dishonest in me to tamper with the text of the MS., by so doing I should perhaps mislead all future generations of scholars by giving currency to what my own imperfect knowledge deems right, instead of what the poet really wrote.

"The two points open to discussion at present are the division of the words and the metres.

"On the first of these points I would only say that the division I have made is not intended to be an *ex-cathedra* declaration that I am right. It is merely a suggestion. In a large majority of cases there can be no doubt, in doubtful passages future scholars are at liberty to alter as they please. The question will probably be a debatable one for centuries to come.

"As to the metres, I could easily by doubling single letters, reducing double letters to single, and otherwise hiccussing the text, bring the metres into accordance with the modern rules of Hindi prosody. But this I will not do, it is not fair. I put before the world the exact spelling of my MS., and scholars can manipulate it as they like. What the world wants, is not Prithiraja Raso by Beames, but Prithiraja Raso by Chand.

"Having thus clearly stated my 'platform,' I beg to retire from the controversy for which I have neither time nor taste. If critics like to pull the text to pieces, they can, it matters nothing to me. It is not I who wrote the poem, but Chand, I am a mere printer's devil putting what Chand wrote into type, and if scholars find fault with Chand, they may cudgel him to their heart's content, it is no affair of mine."

Also a letter from the Secretary to the Government of India, Foreign Department, conveying the thanks of the Viceroy and Governor-General in Council to the Society for their offer of cordial co-operation and assistance in furthering the Scientific objects of the Yarkand Mission, and stating that

H. E. in Council would be glad to be favoured with any further observations which might occur to the Council of the Society, as to the specific points to which the attention of the officers attached to the Mission should be directed.

In compliance with this request, the following memorandum has been drawn up by the Natural History and Physical Science Committees, and submitted to Government.

Memorandum of Subjects for Scientific Observation to which the attention of the Members of the Yarkand Mission may be particularly directed.

As the Council of the Society have not been informed of the strength and qualifications of the scientific party which has been, or will be, selected to accompany the Yarkand Mission, or of the routes they will follow, and the facilities available for carrying out those investigations which seem the most desirable, it is somewhat difficult to form an idea of the particular branches of science in which the members of the Mission will best be able to make observations, but without going into details they will endeavour to notice the principal points to which attention may most advantageously be directed.

ZOOLOGY AND BOTANY.—The knowledge of Zoology and Botany to be obtained from these regions will chiefly depend upon the facilities and assistance which the Naturalist of the Expedition will have in procuring and transporting Zoological and Botanical specimens. There can be no doubt that both, and particularly the former, will prove of great interest, not only for the study of our Indian fauna, but also as being intermediate between that of India and Siberia on the one hand, and that of the Mediterranean-Caspian and the Northern Chinese and the Japanese on the other hand. It would be very interesting to notice whether any and which of the birds and also of the mammals which leave Siberia during the winter for the South, remain in the Trans-Himalayan valleys.

Such observations would greatly aid the study of the geographical distribution of animals. Reliable observations regarding the forms of animal and vegetable life at great altitudes will be of particular interest, and especially so on the Karakoram range, which is not only the true watershed between north and southern Asia, but virtually the average highest mountain range in the world.

If any limestone caverns be met with, they should be carefully searched, especially if of great extent, for any traces of the existence of a subterranean blind fauna such as has made the caves of Carniola in Europe, and of Kentucky in America, so famous. The position in the cave of such animals as may be found should be noted, so that the observations of Schiödt—that those animals nearest the mouth of the caves of Carniola were most nearly

allied to forms co-existing in the surrounding country, and had their eyes least affected of all, while of those that occupied the deepest recesses none had even representatives in the fauna of the country around, and all had their organs of vision completely aborted by disuse,—may receive corroboration.

GEOLOGY.—In Geology there is an immense field for observation. One of the principal tasks for the Geologist should be to construct a geological section across the Himalayan and Karakoram ranges, a section which would bear comparison with similar ones made across the Alps in Europe. It is needless to say that the officer entrusted with this work should be well acquainted with the geological structure of the Alps.

Collections of fossils made in these regions would materially aid in establishing a proper correlation between the geological formations of the Himalayas and those of the Alps. It is known from previous travellers that the large plain of Tibet was formerly inhabited by huge Pachyderms such as, Elephants, Mammoths, &c. similar to those which we find on this side of the Himalayas in the Sewalik deposits. As yet only stray fragments of these ancient relics have reached the scientific world, and an endeavour should be made not only to collect as many of these fossils as possible, but also to ascertain the age and stratigraphical relations of the deposits which contain them. Further, it is possible that the great Vienna and Hungarian Miocene basin, which gradually retreated towards the Caspian Sea as the centre, extended eastwards as far as the Pamir heights. Any information on the subject would prove of very great geological interest. We know on the one hand that the Eocene nummulitic deposits are found in Japan, while the southern parts of China, according to the recent explorations of Baron Richthofen, chiefly consist of crystalline and other rocks not younger than the Trias. It is possible that the Eocene Sea extended from Europe right through Central Asia to Japan. Geological data bearing on this subject should be recorded with particular care.

MINERALOGY.—Among useful minerals, Coal may be found, as it is believed that rocks of the carboniferous age have been brought from beyond the Karakoram. Again the Geological position of Jade, Turquoise, Amber, and other minerals brought from Trans-Himalayan regions, should as far as possible be ascertained. The Gold-washings should if possible be inspected.

PHYSICAL GEOGRAPHY.—The general physical features of a country are so intimately connected with its Geological Structure, that a Geologist ought to be able to do justice to them, if he co-operate with the Topographical Surveyor. Particular attention should be paid to the former extent and depth of the Central Asian lakes and water-basins, and their gradual diminution, because information on this subject will give us an idea of the former

greater richness of animal and vegetable life in those regions, and because it is intimately connected with evaporation. The existence and nature of saline deposits such as Borax, Salt, Carbonate of Soda, &c., should not be overlooked in connection with this subject. The extent, flow, and progress of glaciers should be noted.

The party should be supplied with the instruments necessary to make these observations, and also with a suitable instrument, by which the evaporating power of the air can be, at least approximately, determined at different elevations in the valleys and on large glaciers.

METEOROLOGY.—Whether Meteorological observations can be taken with any degree of fulness must depend greatly on the means of transport. If these do not admit of instruments being taken, other than such as are most compact and portable, it will be necessary to restrict the observations to the temperature and humidity of the air, to the direction and estimated force of the wind, the occurrence of rain, and the forms, quantity and movements of the clouds: but if the means of carriage suffice, a barometer, radiation-thermometer, an anemometer and an actinometer should be taken, and also a small rain-gauge. The chief points to which attention should be given are the following:

1. The diurnal range of temperature in the shade; which may be expected to be very great in so dry a country. Care will be required in selecting a proper place for the thermometers to guard them from being affected by direct radiation to or from the clear sky.

2. The minimum temperature of radiation at night should be observed whenever possible by a thermometer placed on the ground, and fairly exposed to the sky. In taking these observations, it is necessary, if the ground is not level, to place the instrument in a slight hollow or on black woollen cloth in a shallow box, or it will be affected by the convection of the air, and show a temperature many degrees higher than one protected from this influence. It is probably greatly owing to this cause that the registered temperature of nocturnal radiation at certain of the Himalayan stations appears to be but little below that of a shaded thermometer.

3. Any observations of the absolute heating power of the sun will be very valuable, since the dryness of the air is such, that its absorption of solar heat must be small. At such times particular attention should be paid to the clearness of the atmosphere from dust, since if a dust haze prevails to any great height, the absorption of solar heat by the atmosphere may be very considerable. If the means of transport do not allow of an actinometer being taken (Hodgkinson's is the best) the maximum heat of the sun, taken by a black bulb thermometer in vacuo, will be valuable.

5. Observations of barometric pressure will probably be made for the determination of heights. If possible, a few sets of hourly observations ex-

tending from midnight to midnight should be taken, for showing the range and periods of the diurnal oscillation. At the Himalayan hill stations, the morning minimum is most frequently the absolute minimum of the day, which is far from being the case in the plains of India.

It will be interesting to see whether on the more elevated parts of the Himalaya and Trans-Himalayan plateaux, the oscillation follows the same law as on the Indian plains or that of the hill stations. Also how the epochs of maximum and minimum vary in the higher latitudes.

6. A register of the direction and (in the absence of an anemometer) the estimated force of the wind according to the Brunfort Scale, is specially important. Particular attention should be given to the direction in which the clouds drift.

It is stated by Mr. Shaw that in Eastern Turkistan, the wind is chiefly from the north up to the great mountain range, whereas it appears from Hooker's and others' observations, that to the south of Tibet it is from the south at all times of the year. It is scarcely necessary to say that among the mountains, the winds are greatly affected by the direction of the valleys, so that the movement of the clouds is the best criterion of that of the great air currents. But any observations on the local variations of the wind will be of interest. Its diurnal changes in the valleys and in the passes are worthy of special observation. The violent winds from the south which blow through the passes during the afternoon hours are described by many travellers, and are referred by General Strachey to the heating and rarefaction of the air over the lofty table-lands of the interior.

Night winds also blow down the valleys, which are probably streams of air cooled by radiation and gravitating like water down the hill slopes and beds of the valleys. Any observation on them, the time they set in, their duration and force, and the temperature of these winds will be important. Also their upper and lower limits.

7. The humidity of the air will necessarily be very low. It should be observed when actinometer observations are taken; and whenever hourly observations of the barometer are made, those of the hygrometer should be made also. Besides these, observations of the wet and dry bulb thermometer should be taken at other times as often as practicable. The movements of the clouds have already been referred to. Their quantity, forms, and estimated height at different seasons should also be attended to. These and the wind observations may be made at all times without the aid of instruments other than a compass.

MAGNETIC OBSERVATIONS.—The only attempt to procure Magnetic Observations in Thibet and Turkistan of which the Council are aware, was made in 1857 by the Brothers Schlagentweit, one of whom lost his life in the expedition. They only made a small number of observations and none

have since been attempted, so that the magnetic condition of the country north of the Himalayas may be looked upon as utterly unknown.

John A. Bourn who made a Magnetic Survey of part of Southern India in 1854 remarked in the year 1860, that the magnetic lines in India are so abnormal, and so discordant with the usual theory, that a thorough examination of the whole area about the Himalayas was strongly to be recommended. As the subject is one of extreme importance and as the opportunity now presented of making such observations is one which may not occur for some time, the Council would urge upon the attention of the Government, the desirability of taking advantage of it as far as may be practicable and would suggest that Col. Walker, the Superintendent of the G. T. Survey, should be consulted on the subject, and be asked, if he has not already done so, to make arrangements for the supply of such of the necessary instruments as may be available in India, and can be taken with the expedition.

If possible the intensity should be determined at a few places, but if the time at the disposal of the observer should not be sufficient for the determination of this, observations of the declination and dip at even a few points would be valuable.

GEOGRAPHY.—The appointment of an officer of the G. T. Survey, under the direction of Col. Walker, R. E., is a guarantee that the interests of geographical science will be furthered to the utmost possible extent, and considering that Col. Walker is most probably in possession of all available information regarding the geography of these regions, it seems unnecessary to the Council to enter into details on this subject beyond pointing out the desirability of making, if possible, an exploration in advance, North and East from Yarkand, towards Karashar.

ETHNOLOGY.—An endeavour should be made to ascertain whether any traces of a pre-historic race of man exist. Caves and sub-recent gravel deposits ought to be searched for any human or animal remains they may contain. Attention should be paid to the physical characteristics of the different races inhabiting the regions visited by the Mission, and any information as to their origin, migrations, language and dialects, the distinctive appellations of the tribes and their subdivisions would be valuable. In all cases when possible, measurements, and photographs showing the general appearance and costume, as well as the distinctive facial characteristics and shape of the heads of males and females of the different races and tribes, should be taken and carefully recorded.

HISTORY AND ANTIQUITIES.—It is unknown what historical records and ancient remains exist in Turkistan, but every opportunity should be taken of securing oral and written information, with copies of any inscriptions bearing on the history and antiquities of the countries visited by the Mission.

Endeavour should be made to obtain the following MSS—

1. *Tárikh i Rashídí*, by Mírzá Haidar Gúrgání. It is a history of Káshghar to the reign of 'Abdurashíd, king of Káshghar (16th century), and contains interesting descriptions of Tibbet, Káshghar and Kashmír.

2. *Tuzkirah Muqím Khání*.—A history of the Uzbek Kháns of Transoxiana.

3. Any other history of the family of Chingiz Khán, especially of more modern date. For the history of Káshghar during the 17th, 18th and 19th centuries we have no work whatever.

4. A *Tuzkirah*, or history of the literature, of Káshghar and surrounding countries.

5. *Nasabnámahs*, or genealogical works on the tribes in Kipchák, Bukhárá, Káshghar, and Mughulistán (Mongolia) in general.

A Collection of Coins, Plans, Photographs, and descriptions of Buddhist and Muhammadan antiquities will also be very valuable.

Mr. H. Rivett-Carnac said that, as being a member who seldom had an opportunity of attending the meetings of the Society, he had some diffidence in making a suggestion. He quite thought with the President, that the members of the Mission had been so well selected, that there was little likelihood of anything of real interest escaping their attention. But as the Government of India had asked the Society for suggestions, and as suggestions had been made in some detail on one or two points, he (Mr. Rivett-Carnac) would ask that the members of the Mission might be requested to gather what information they could regarding any tumuli, or barrows they might pass on their journeys. It would be very interesting to learn how far these tumuli resembled, both in their construction and contents, those discovered in many parts of India, and it might perhaps hereafter be possible to trace, with the help of an unbroken chain of these remains, the inroads, at a very early date, of tribes from the centre of Asia into India.

The following papers were read :

1. *Notes on Children found living with Wolves in the North Western Provinces and Oudh*.—By V. BALL, Esq., B. A., *Geological Survey of India*.

(Abstract.)

The author after some prefatory remarks, gives the following extract from a letter he had received from the Revd. Mr. Erhardt, Superintendent of the Orphanage at Secundra, in reply to his request for information regarding a boy in that Institution, who was alleged to have been found living with wolves.

"We have had two such boys here, but I fancy you refer to the one who was brought to us on March 5th, 1872. He was found by Hindus, who had gone hunting wolves in the neighbourhood of Mynpuri. Had been burnt out of the den, and was brought here with the scars and wounds still on him. In his habits he was a perfect wild animal in every point of view. He drank like a dog, and liked a bone and raw meat better than anything else. He would never remain with the other boys, but hide away in any dark corner. Clothes he never would wear, but tore them up into fine shreds. He was only a few months among us as he got fever and gave up eating. We kept him for a time by artificial means but eventually he died.

"The other boy found among wolves is about thirteen or fourteen years old, and has been here almost six. He has learnt to make sounds, speak he cannot; but he freely expresses his anger and joy; work he will at times, a little; but he likes eating better. His civilisation has progressed so far that he likes raw meat less, though he still will pick up bones and sharpen his teeth on them.

"Neither of the above are new cases however. At the Lucknow Mad-house there was an elderly fellow only four years ago and may be alive now, who had been dug out of a wolves' den by a European doctor, when, I forget, but it must be a good number of years ago.

"The facility with which they get along on four feet (hands and feet) is surprising. Before they eat or taste any food they smell it, and when they don't like the smell, they throw it away."

Mr. Ball then quotes the well-known story (*vide* Ann. and Mag. Nat. Hist., 1851 p. 163) of the capture of one of these wolf-reared children on the banks of the Gumpti, who was afterwards taken to Lucknow and who is in all probability the "elderly fellow in the Lucknow Mad-house" referred to in Mr. Erhardt's letter.

The writer then draws attention to a remarkable feature in all the stories, viz., that the wolves are invariably alleged to have communicated much of their natural ferocity and notably untamable disposition to their foster children, and attempts to account for their somewhat unwolf-like treatment of them.

The author, in conclusion, states that his object in putting forward this account, is to bring about a thorough investigation of a subject which, if these stories of wolf-reared children could be substantiated, must prove of considerable physiological interest and importance.

Mr. Blanford said he could not think the evidence adduced by any means satisfactory, and he would be glad could any one endowed with some amount of judicial scepticism, visit the Secundra Orphanage and ascertain as far as possible on what kind of testimony, these accounts of wolf-children

really rested. He did not of course question that the Superintendent of the Secundra Orphanage wrote in good faith that which he really believed.

After some further discussion it was agreed, on the motion of the President, that the Secretary should write to the Superintendents of the Secundra Orphanage and the Lucknow Lunatic Asylum so as to obtain, if possible, further information on the subject.

2. *Rude Stone Monuments in Chutiá Nágpúr*.—By COL. E. T.

DALTON, C. S. I., *Commissioner of Chutiá Nágpúr*.

(Abstract.)

Col. Dalton describes in this paper the sepulchral and monumental stones of the Kols. He first mentions those which he saw in the Saranda Pir (Singhbhúm District), the inhabitants of which are of the Munda type of Kols, who, to judge from their Mongolian features, are a very primitive race. The author also gives a sketch of the great Munda burial ground of Chokahatu, 'the place of mourning,' in Lohárdaggá District, where he counted 7,360 tombs, mostly of the dolmen or cromlech form, all close together, covering an area of seven statute acres. The horizontal slabs of the tombs are generally huge masses of gneiss, often exceeding 15 feet in length and 4 feet in breadth.

The monumental stones are less in number than the sepulchral, and they resemble in many details the Kasia cenotaphs described by Col. Yule.

Photographs of the Chokahatu Burial Ground and sketches of monumental stones accompany the paper.

Mr. Blanford said, any one acquainted with the monuments of the Khasia Hills must be at once struck with the many points of resemblance between them and those, sketches of which accompany Col. Dalton's paper. The most important point to be noticed is the association of the upright stone, the *menhir* with the low flat *dolmen* in front; an association which is invariable on the Khasi Hills, and, according to Major Godwin-Austen's account, has not received any other explanation than that of custom. He says "The tall upright stones are called *Mao bynna*, from *mao*, a stone, *bynna* to make known, literally 'a monument.' They are also known by the term *Mao shinran*, the male stone, while the flat scat-like slab in front, is called *Mao Kynthai* the female stone, representative of all life, being in pairs. My informant explained this, by saying the monument would be imperfect without the flat stone or its female adjunct." The similarity of the arrangement, combined with the fact that the Mundas are stated by Col. Dalton to have a decided Mongol physiognomy, is very remarkable, and suggests a closer connection than usual between two tribes now separated by the whole extent of the plains of Bengal.

On the other hand, certain important differences must not be overlooked. First in the number of the *Menhirs*. Col. Dalton's sketches exhibit a single *menhir* to each *dolmen*. This the speaker believed is never the case on the Khasi Hills. The number is never less than three, and the greatest number noticed by Major-Godwin Austen is eleven, the number being, however always odd. Again, it appears from Col. Dalton's account, that the Munda stones are sepulchral monuments. This is not the case on the Khasi Hills, at all events now. They are there of a votive character and have no connection with funeral customs. A person who is ill or who desires the assistance or protection of an ancestor, vows a certain number of stones, if he recovers from his illness, or if the ancestor proves propitious. The ancestor who is supposed to have power in the case in question, is discovered by the breaking of eggs or other means of divination, and sometimes when the favours are prolonged and repeated, additional stones are set up, in acknowledgement of the benefits received.

Col. Dalton does not refer to Major Godwin-Austen's account and may not have seen the original, but he is probably acquainted with it as it is quoted in Fergusson's 'Stone Monuments' of which he speaks in his paper. The original, published in the Journal of the Anthropological Institute is the most complete description the speaker had seen of the stone monuments of the Khasi Hills. If Col. Dalton should have any further opportunity of examining the Munda monuments, it would be of interest to ascertain whether there is no instance of a multiple arrangement of the *menhirs*, and whether they are ever set up as votive memorials. His account seems to leave no doubt as to the sepulchral character of those he describes.

Mr. H. Rivett-Carnac submitted that the paper, with its illustrations, contributed by Colonel Dalton was of the greatest interest, as giving another case of a tribe, living in an unfrequented hill-country, which appeared to have practised from time immemorial, and still to continue to practise, a system of erecting monuments over their dead, similar to the pre-historic remains observed in the hill-country, and comparatively inaccessible tracts of other parts of India. In the basalt, or trap country, where boulders of trap only could be obtained, the tumuli took the form of barrows, or circular mounds surrounded with boulders. When the sandstone formation was reached, where it was not difficult to split the block of stone into slabs, burying places somewhat similar to these shewn by Colonel Dalton, took the place of the barrows. These had been figured, and described by Colonel Meadows Taylor, C. S. I. and other members of the Society, and he (Mr. Rivett-Carnac) had had the honor of bringing the subject of some of the tumuli in Central India to the notice of the Society.

His chief interest in these tumuli and their contents was their striking resemblance (pointed out by Colonel Taylor) to those that existed in many

parts of Europe. During his recent visit home, he (Mr. Rivett-Carnac) had had an opportunity of visiting the excellent Prehistoric Museum presented to the town of Salisbury by Messrs. Blackmore and Stevens, and he had been much struck with the great similarity between the remains dug out of the barrows of Central India, (which had been exhibited to the Society) and those discovered in the English Barrows.

As in Europe so in India, these tumuli were generally to be found in what, for a long time, at least, must have been very inaccessible parts of the country. The tribes in India who kept up the old customs were, so far as he could understand, quite a different race from their neighbours of the plains, and the view seemed to be generally accepted that these hill-men were all that now remained of the tribes found in India by the Aryans on their taking possession of the country. Future enquiries, and discoveries might, perhaps, establish the view which had been suggested in many quarters, that the builders of the tumuli in Europe and Asia were originally of the same Central Asian stock, one portion of which, in ages past had marched westward, another moving southward towards India. As time went on other, other and more powerful hordes, following the same routes taken by their predecessors several centuries before, drove into the woods and fastnesses these so-called aboriginal tribes, whose common origin is suggested by the similarity in the monumental remains found in many parts of Northern Europe, and also in Central and Southern India, and among the hills inhabited by the tribes of which Colonel Dalton had given the Society so interesting a description.

Dr. Anderson remarked that the fact mentioned by Col. Dalton that the Mundás of Chutiá Nágpúr exhibit distinct traces of a Mongolian origin in the style of their features was one of great interest. Many years ago, Mr. Logan had pointed out, and more recently Sir George Campbell, that there is a similarity between the language of the aboriginal tribes of Chutiá Nágpúr and the language of the Burmo-Malayan people. In connection with this subject, there is an interesting commentary, or verification of Col. Dalton's statement regarding the Mongolian affinity of the Kolarians, to be found in the last number of the Philological Section of the Asiatic Society's Journal. There Sir A. Phayre points out that the first syllable of the word Mundá which is the word used to designate the language of several tribes of the western highlands of Bengal, is identical with the race name of the people of Pegu, and he is of opinion that the Mun or Talaing people of Pegu are of the same stock as the Kols. Thus these two authorities arrive at the same conclusion independently of each other and by two widely different methods.

The word Muang which is of such frequent occurrence in Western Yunan, and along both banks of the Cambodia, would seem to be the same

as the Pegu Mun, for it means a district or country. In all probability, it was first applied to the aboriginal people of those parts, but as they gradually disappeared before the conquerors, or were absorbed by them, it was eventually transferred to the country which they had inhabited, or was restricted to districts in which they had been originally in great force. We thus find in Yunan Mungla, which would appear to be identical with the Kolarian Munda.

Col. Mainwaring said—

I have been requested to say a few words with regard to a remark made by Sir Arthur Phayre in his interesting narrative 'On the History of Pegu' which appeared in the last number of the Asiatic Society's Journal. In alluding to the inhabitants of Pegu, who, Sir A. Phayre says, are called "Mun, Mwon or Mòn," he refers to Csoma de Körös' Tibetan Dictionary for the definition of the word, there rendered,—a general name for all the people between Tibet and the plains of India,—by which Sir A. Phayre infers, that the inhabitants of Pegu may have originally emigrated from the Hills near Tibet. Csoma De Körös, when inscribing the aforementioned passage in his Dictionary, must have been mistaken or must have written vaguely: for of course there are numerous tribes who inhabit the hills between Tibet and the plains of India, and to all of these, the term Mòn is certainly not applied by the Tibetans. The appellation may have formerly been, or may still be, given to other races, but in Sikim and the neighbouring countries north and east, the Tibetans apply the term Mon alone to the Lepchas. None of the other races are so denominated; for instance the race, Europeans call Butia, (which literally means 'a Tibetan,' from བོད་ *Bod*, *Tibet*), they distinguish by the name of Hlo-pa, literally *Southerners*; the Nepalese they call 'Bal po' (from བལ་པོ་ *Bal po yúl*, the country of wool), &c. It might therefore be considered probable that the inhabitants of Pegu and the Lepchas might have originated from one source. The physical conformation and features of the Mon of Pegu, as represented by Sir A. Phayre, certainly correspond to that of the Lepcha; he describes them as short, stout and fair, especially the Karen tribes, who when young, "are not darker than southern Europeans." The great criterion, however, the language, tends to prove that no affinity exists between them. From test-words in the Mon language of Pegu, taken from Dalton's *Ethnology*, I can find no analogy between that language and the Lepcha tongue. Sir A. Phayre ascribes the fairness of complexion that exists among the Pegu race, to local causes. I should certainly not assume the same cause for that of the Lepchas, whom I have often seen, especially in former days, quite as fair as Europeans; that they must have emigrated, at some early period, from beyond the Himalayas, is undoubted; a people and language, so noble and perfect such as existed under the name of Róng, (by Europeans designated

Lepchas), when Darjiling was first established, could never have been generated in the wilds and isolation of the Himalayas, the body of the people may still exist, and may, perhaps, yet be discovered, probably in the north of China about Mongolia or Manchuria.

The receipt of the following communications was announced—

1. On a new species of Kite. By A. Anderson, Esq., with a note by W. E. Brooks, Esq., C. E.
2. Rude Stone Monuments in Chutia Nagpur. By Col. E. T. Dalton C. S. I.

LIBRARY.

The following additions have been made to the Library since the meeting held in May last.

Presentations.

*** Names of Donors in Capitals.

Bulletin, Mars 1873.

Col. H. Yule.—*L'orographie et le system des eaux du Pamir.* (Extract from the author's essay in Wood's "Sources of the Oxus"). N. de Khanikoff.—*Les documents sur le Khanate de Khiva.* (An abstract of the sources of information available regarding the Khanate of Khiva). Vivien de St. Martin.—*Voyage d'exploration en Indo-Chine.* L'Abbé Desgodins.—*Végétation des sommets au Nord de Yerkalo.* Hauteurs entre Yerkalo et Bathang. (The first of these papers also contains some meteorological observations taken on the range separating the Lan-tsang Kiang from the Kin-cha-Kiang near Yerkalo.)

THE GEOGRAPHICAL SOCIETY OF PARIS.

K. Preussischen Akademie der Wissenschaften zu Berlin. Monatsbericht, December, 1872.

Poggendorf.—*Beitrag zur nähoren Kenntniss der Elektromaschine (Zweiter Art).* Peters.—*Über Hydrus fasciatus,* Schneider, und einige andere Seeschlangen. Hagen.—*Beobachtungen über die Bewegung der Luft und des Wassers.*

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Institution of Mechanical Engineers, Proceedings, Oct. 1872.

A. Morton.—On the ejector condenser for steam engines, dispensing with an air pump. A. C. Hill.—On the working of the improved Compound Cylinder Blowing Engines and Howard Boilers at the Lackenby Iron Works, Middlesbrough. Colonel Clay.—On an improved construction of Tool for Turning metals at increased speed.

THE INSTITUTION OF MECHANICAL ENGINEERS,* BIRMINGHAM.

Bengal Social Science Association, Transactions, Vol. VI.

Address by the President. The Hon. J. B. Phear.—On some features of Litigation in Bengal. W. Clarke.—On Tied Arches. The Rev. J. Long.—Village communities in India and Russia. Mr. J. Geoghegan.—Indian Cooley Emigration. Peary Mohun Mookherjee.—Agriculture in Bengal.

THE BENGAL SOCIAL SCIENCE ASSOCIATION.

Geological Survey of India.

Memoirs, Vol. X, pt. I.

R. B. Foote.—Geology of Madras. H. B. Medlicott.—Sátapura Coal Basin.

Palæontologia Indica, Vol. IV. Pt. 4 Cretaceous Fauna of Southern India.

Dr. F. Stoliczka. The Corals or Anthozoa, &c.

Records, Vol. VI. pt. 2.

V. Ball.—The Bistrámpúr Coal-field. F. R. Mallet.—Mineralogical Notes on the Gneiss of South Mirzapur and adjoining country.

THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

Sketch Map of the Countries between Hindustan and the Caspian Sea April 1873.

THE SURVEYOR GENERAL OF INDIA.

Indian Museum.

Minutes of the Trustees, from Sept. 1866 to March 1872.

TRUSTEES OF THE INDIAN MUSEUM.

Martyn's Universal Conchology, 2 Vols.

DR. F. STOLICZKA.

Report of the Sanitary Commissioner for Bengal for 1871, by Ch. J. Jackson, M. D.—Report on the Administration of the Registration Department in Bengal for 1871-72, by H. Beverley.—Report on the Administration of the Salt Department for 1871-72.

THE GOVERNMENT OF BENGAL.

Exchange.

Nature, Nos. 180-183.

Purchase.

Pratna-kamra-Nandini, Vol. VI. No. 1.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1873.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.662	29.737	29.553	0.184	82.7	93.0	75.5	17.5
2	.644	.697	.579	.118	83.7	92.1	76.0	16.1
	.668	.735	.579	.156	81.0	94.7	72.2	22.5
4	.771	.833	.723	.110	75.6	90.5	71.0	19.5
5	.839	.927	.770	.157	79.1	88.0	71.0	17.0
6	.864	.933	.785	.148	79.6	88.7	71.0	17.7
7	.842	.918	.776	.142	83.4	92.0	75.3	16.7
8	.816	.900	.731	.169	85.5	91.0	80.1	13.9
9	.818	.880	.755	.125	86.5	96.0	80.0	16.0
10	.814	.884	.738	.146	87.6	97.3	80.0	17.3
11	.727	.805	.649	.156	88.7	99.5	80.0	19.5
12	.682	.752	.602	.150	88.8	100.1	81.5	18.6
13	.730	.798	.660	.138	87.2	91.8	80.4	14.4
14	.744	.810	.689	.121	89.3	100.2	80.5	19.7
15	.742	.818	.669	.149	89.9	100.0	81.8	18.2
16	.734	.810	.656	.154	90.3	100.5	82.0	18.5
17	.698	.769	.651	.118	91.1	101.7	82.6	19.1
18	.697	.756	.650	.106	91.4	103.0	83.2	19.8
19	.687	.756	.613	.143	92.0	104.2	83.0	21.2
20	.669	.734	.607	.127	92.1	104.5	83.3	21.2
21	.627	.691	.543	.148	92.3	106.0	83.5	22.5
22	.592	.651	.514	.137	91.4	104.0	83.2	20.8
23	.574	.650	.495	.155	89.8	99.0	82.0	17.0
24	.646	.702	.588	.119	87.3	97.0	76.5	20.5
25	.676	.731	.584	.147	86.6	98.8	77.0	21.8
26	.666	.725	.589	.136	87.5	96.5	79.0	17.5
27	.677	.751	.610	.141	83.7	91.5	79.4	12.1
28	.608	.673	.537	.136	82.4	88.5	78.9	9.6
29	.524	.589	.430	.159	81.4	91.5	79.5	12.0
30	.467	.515	.392	.123	81.3	91.3	80.0	11.3
31	.442	.505	.374	.131	86.0	93.7	81.3	12.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. — (Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	78.4	4.3	75.4	7.3	0.865	9.30	2.42	0.79
2	79.4	4.3	76.4	7.3	.893	.58	.49	.79
3	79.2	4.8	75.8	8.2	.876	.39	.78	.77
4	72.9	2.7	71.0	4.6	.751	8.17	1.31	.86
5	74.5	4.6	71.3	7.8	.758	.20	2.33	.78
6	74.3	5.3	70.6	9.0	.741	.00	.69	.75
7	76.7	6.7	72.0	11.4	.776	.31	3.65	.70
8	79.4	6.1	75.1	10.4	.857	9.15	.57	.72
9	79.7	6.8	75.6	10.9	.871	.27	.83	.71
10	80.7	6.9	76.6	11.0	.899	.56	.96	.71
11	80.0	8.7	74.8	13.9	.819	.00	4.96	.65
12	80.0	8.8	74.7	14.1	.816	8.97	5.03	.64
13	77.4	9.8	71.5	15.7	.763	.11	.26	.61
14	80.1	9.2	74.6	14.7	.843	.92	.29	.63
15	82.0	7.9	77.3	12.6	.919	9.72	4.74	.67
16	80.9	9.4	75.3	15.0	.862	.12	5.51	.62
17	79.1	12.0	71.9	19.2	.773	8.16	6.81	.55
18	79.2	12.2	71.9	19.5	.773	.14	.96	.54
19	81.1	10.9	74.6	17.4	.843	.89	.47	.58
20	81.7	10.4	75.5	16.6	.868	9.14	.27	.59
21	82.3	10.0	76.3	16.0	.890	.38	.12	.60
22	83.6	7.8	78.9	12.5	.967	10.20	4.90	.68
23	82.2	7.6	77.6	12.2	.928	9.83	.59	.68
24	78.9	8.4	73.9	13.4	.824	8.78	.63	.66
25	78.2	8.4	73.2	13.4	.806	.59	.55	.65
26	78.9	8.6	73.7	13.8	.819	.71	.78	.65
27	80.0	3.7	77.4	6.3	.922	9.89	2.18	.82
28	78.8	3.6	76.3	6.1	.890	.57	.04	.82
29	79.5	4.9	76.1	8.2	.885	.48	.83	.77
30	79.7	4.6	76.5	7.8	.896	.59	.69	.78
31	80.3	5.7	76.3	9.7	.890	.50	3.41	.74

. All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1878.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.701	29.933	29.478	0.455	81.6	86.5	71.6	14.9
1	.691	.874	.468	.406	81.3	86.0	71.3	14.7
2	.680	.854	.457	.397	80.9	85.3	71.2	14.1
3	.670	.840	.446	.394	80.6	84.6	71.0	13.6
4	.671	.824	.434	.390	80.2	83.8	71.0	12.8
5	.685	.866	.445	.421	80.1	83.6	71.0	12.6
6	.699	.864	.463	.401	80.2	83.5	71.0	12.5
7	.720	.883	.479	.404	81.4	85.2	72.0	13.2
8	.737	.912	.496	.416	84.2	88.5	76.7	11.8
9	.748	.918	.505	.413	87.4	92.0	79.7	12.3
10	.748	.917	.491	.426	90.2	95.6	82.4	13.2
11	.740	.927	.478	.449	91.8	98.6	84.0	14.6
Noon.	.720	.916	.452	.464	93.2	101.2	79.4	21.8
1	.701	.893	.431	.462	94.2	104.0	74.0	30.0
2	.674	.866	.405	.461	94.9	104.5	71.0	33.5
3	.651	.835	.386	.449	95.3	106.0	71.6	34.4
4	.631	.809	.374	.435	94.8	106.0	71.5	34.5
5	.620	.796	.392	.404	93.3	103.9	71.0	32.9
6	.632	.788	.394	.394	90.3	100.7	71.0	29.7
7	.647	.807	.407	.400	87.3	96.0	71.0	25.0
8	.671	.832	.418	.414	85.6	92.0	71.0	21.0
9	.688	.860	.423	.437	84.2	89.8	72.0	17.8
10	.699	.900	.414	.456	82.8	87.6	72.1	15.5
11	.701	.927	.440	.487	82.3	86.8	71.0	15.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour	Bulb Ther- mometer	Bar- ometer	Dew Point	Distance above Dew	Barometer inches	Mean Weight of Vapor in a Cubic foot of air.	Mean Dew Point	Mean Relative Humidity
Mid- night.	78.5	3.1	76.3	5.3	0.890	9.59	1.75	0.85
1	78.5	2.8	76.5	4.8	.896	.65	.59	.86
2	78.2	2.7	76.3	4.6	.890	.59	.51	.86
3	78.0	2.6	76.2	4.4	.887	.58	.43	.87
4	77.9	2.3	76.3	3.9	.890	.61	.27	.88
5	77.9	2.2	76.1	3.7	.893	.61	.20	.89
6	78.1	2.1	76.6	3.6	.899	.69	.19	.89
7	78.8	2.6	77.0	4.4	.910	.81	.46	.87
8	79.7	4.5	76.5	7.7	.896	.59	.65	.78
9	80.6	6.8	76.5	10.9	.896	.54	.91	.71
10	81.0	9.2	75.5	11.7	.868	.18	.41	.63
11	81.0	10.8	74.5	17.3	.810	8.87	.40	.58
Noon	80.7	12.5	73.2	20.0	.806	.47	7.43	.53
1	79.9	11.3	71.3	22.9	.758	7.95	8.41	.49
2	79.4	15.5	70.1	24.8	.729	.61	9.05	.46
3	79.9	15.1	70.7	24.6	.744	.78	.11	.46
4	79.6	15.2	70.5	24.3	.739	.74	8.91	.47
5	80.4	12.9	72.7	20.6	.792	8.32	7.63	.52
6	80.1	10.2	74.0	16.3	.827	.75	5.88	.60
7	79.9	7.4	75.5	11.8	.868	9.23	4.18	.69
8	79.6	6.0	75.4	10.2	.865	.24	2.52	.72
9	78.7	5.5	74.8	9.4	.819	.09	.15	.74
10	78.9	3.9	76.2	6.6	.887	.52	2.23	.81
11	78.7	3.6	76.2	6.1	.887	.51	.01	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1873.*

Solar Radiation, Weather, &c.

Station	Gauge ft. above Ground.	WIND.		Max. Pressure Daily Velocity.		General aspect of the Sky.
		Prevailing direction.				
o	Inches		lb	Mile		
1	140.8	0.35	S by W, S & S E	9.6	175.0	S to 3 A. M., B to 7 A. M., \nearrow i to 1 P. M., \searrow i to 4 P. M., \nearrow i to 7 P. M., B to 17 P. M. High wind from $4\frac{1}{2}$ to $6\frac{1}{2}$ P. M. T at 6 P. M. R. between 5 & 6 P. M.
2	142.5		S E & S	0.4	246.6	B to 4 A. M., \searrow i to 9 A. M., \searrow i to 12 A. M., \nearrow i to 3 P. M., S to 9 P. M. B to 11 P. M. T at 5 P. M., L from $7\frac{1}{2}$ to 9 P. M.
3	143.0	0.66	S S W & S	10.3	250.6	S to 7 A. M., \nearrow i to 5 P. M., O to 8 P. M., S to 11 P. M. High wind from 6 to $6\frac{1}{2}$ P. M., T from $5\frac{1}{2}$ to 7 P. M., L from 6 to 10 P. M. R between 5 & 6 and at 8 P. M.
4	137.0	0.94	Variable	25.0	222.6	B to 4 A. M., clouds of different kinds to 9 A. M., \nearrow i to 12 A. M., O to 11 P. M. Storm from $12\frac{1}{2}$ A. M. to $1\frac{1}{2}$ P. M. High wind between 10 & 11 P. M. T & L from 1 to 11 P. M. R from 1 to 6 & at 8 P. M.
5	136.0	0.60	Variable	5.2	228.2	O to 7 A. M., \searrow i to 11 A. M., \nearrow i to 8 P. M., O to 11 P. M. High wind from 9 to $10\frac{1}{2}$ P. M. L from 7 to 11 P. M. T & R between $9\frac{1}{2}$ to 11 P. M.
6	134.8	0.27	Variable		165.3	O to 3 A. M., \searrow i to 7 A. M., \searrow i to 11 A. M., \nearrow i to 6 P. M., B to 11 P. M. L at midnight & 1 A. M. Slight R from midnight to 2 A. M.
7	138.8		S W & W S W		107.0	S to 3 A. M., \searrow i to 7 A. M., \searrow i to 11 A. M. B to 11 P. M.
8	142.0		S W & S		126.3	\searrow i to 7 A. M., \searrow i to 1 P. M. \nearrow i to 3 P. M. B to 6 P. M., \searrow i to 11 P. M.
9	139.0		S & S W		164.6	B to 4 A. M., \searrow i to 6 A. M. B to 1 P. M., \searrow i to 11 P. M.

\nearrow i Cirri, \searrow i Strati, \nearrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati, \searrow i Nimib, \searrow i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
10	143.0	...	S W & W S W	...	191.0	B to 4 A. M., \searrow i to 6 A. M., \searrow i to 9 P. M., \searrow i to 11 P. M.
11	145.8	...	S W & Variable	...	166.8	\searrow i to 6 A. M. B to 1 P. M., \searrow i & \searrow i to 6 P. M. B to 9 P. M., \searrow i to 11 P. M.
12	146.0	...	S & Variable	2.8	175.6	\searrow i to 11 A. M., \searrow i to 2 P. M., \searrow i to 5 P. M. O to 8 P. M., \searrow i to 11 P. M. Brisk wind between 7 & 7½ P. M. T & L from 6½ to 8 P. M. D between 7 & 8 P. M.
13	146.0	...	W N W & Variable	...	153.9	\searrow i & \searrow i to 4 A. M. S to 7 A. M., \searrow i to 8 P. M. B to 11 P. M.
14	147.5	...	W S W	...	152.1	\searrow i to 4 A. M. B to 12 A. M., \searrow i to 6 P. M., \searrow i to 11 P. M.
15	144.2	...	S & S W	...	159.6	B to 2 P. M., \searrow i to 8 P. M. B 11 P. M. T at 5 P. M. L on N at 8 P. M.
16	143.7	...	S W & Variable	...	145.1	\searrow i to 8 A. M. B to 11 P. M.
17	148.3	...	Variable	0.2	129.6	B to 6 A. M., \searrow i to 9 A. M. B to 11 P. M.
18	146.5	...	W by N	...	124.9	B.
19	151.2	...	S W & W by S	...	139.9	B.
20	150.5	...	W & S S W	...	138.9	S to 1 A. M. B to 11 P. M.
21	150.0	...	S W & W S W	...	182.7	B.
22	150.2	...	S W & S	...	207.0	Chiefly B.
23	142.7	...	S S W	2.0	306.0	B to 7 P. M., clouds of different kinds to 11 P. M. Brisk wind from 12½ A. M. to 5½ & 11 to 11½ P. M. L from 8½ to 10 P. M.
24	143.0	...	S S W & S by E	11.0	401.3	O to 2 A. M., \searrow i to 8 A. M., Scuds to 11 A. M., \searrow i to 8 P. M. O to 11 P. M. Strong wind from 11½ to 12 P. M. L. from 8 to 11 P. M. Dat 8½ P. M.

\searrow i Cirri, \searrow i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati, \searrow i Nimbi, \searrow i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1873.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	o	Inches				
	145.0		Variable	4.0	239.2	O to 2 A. M., B to 4 A. M., \searrow i to 10 A. M., \searrow i to 4 P. M., \searrow i to 8 P. M. S to 11 P. M. Brisk wind from midnight to 0½ A. M. L at midnight & 1 A. M. and from 8 to 11 P. M.
26	144.7		S S W	1.0	280.4	O to 5 A. M., \searrow i to 8 A. M., \searrow i to 6 P. M. B to 11 P. M. T at 4 P. M. L from midnight to 2 A. M. Dat 12½ A. M. & 4½ P. M.
	106.0	0.82	S by W & S	5.0	182.4	B to 6 A. M., \searrow i to 10 A. M. O to 2 P. M. S to 4 P. M., \searrow i to 6 P. M. B to 11 P. M. High wind from 11 to 11½ A. M. T from 10½ A. M. to 1 P. M. R at 8 and from 11 to 12½ A. M.
28	136.5	0.06	S & S by W	1.4	124.0	B to 3 A. M., clouds of different kinds to 11 P. M. T at 12 A. M. & 3½ P. M. L between 7 & 8 P. M. Slight R at 12 A. M. and 3½ P. M.
29	140.0	...	S by W & E N E	0.2	133.8	S to 5 A. M., \searrow i to 7 A. M., \searrow i to 2 P. M., \searrow i to 7 P. M. S to 11 P. M.
30	140.5	0.03	E N E & N E	0.4	154.0	O to 7 A. M., \searrow i & \searrow i to 7 P. M., \searrow i to 9 P. M. B to 11 P. M. Light R at 10½ A. M. & 1½ P. M.
31	141.7	0.05	N E & E by N	1.2	218.2	S to 6 A. M., \searrow i to 4 P. M., clouds of different kinds to 11 P. M. Slight R at 5 P. M.

\searrow i Cirri — i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati \searrow i Nimbi,
 \searrow i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.689
Max. height of the Barometer occurred at Midnight on the 6th ...	29.933
Min. height of the Barometer occurred at 4 P. M. on the 31st ...	29.374
<i>Extreme range</i> of the Barometer during the month ...	0.559
Mean of the daily Max. Pressures	29.756
Ditto ditto Min. ditto	29.616
<i>Mean daily range</i> of the Barometer during the month ...	0.140

	°
Mean Dry Bulb Thermometer for the month	86.6
Max. Temperature occurred at 3 & 4 P. M. on the 21st ...	106.0
Min. Temperature occurred at 6 A. M. on the 5th ...	71.0
<i>Extreme range</i> of the Temperature during the month ...	35.0
Mean of the daily Max. Temperature	96.5
Ditto ditto Min. ditto,	79.5
<i>Mean daily range</i> of the Temperature during the month ...	17.4

Mean Wet Bulb Thermometer for the month	79.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	7.3
Computed Mean Dew-point for the month	74.9
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.7

	Inches.
Mean Elastic force of Vapour for the month	0.851

	Troy grain.
Mean Weight of Vapour for the month	9.06
Additional Weight of Vapour required for complete saturation ...	4.08
Mean degree of humidity for the month, complete saturation being unity	0.69

	°
Mean Max. Solar radiation Thermometer for the month	142.2

	Inches.
Rained 12 days,—Max. fall of rain during 24 hours!	0.94
Total amount of rain during the month	3.78
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	3.28
Prevailing direction of the Wind	S. W & S. S. W.

* Height 70 feet 10 inches above ground.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JULY, 1873.

A meeting of the Asiatic Society of Bengal was held on Wednesday, the 2nd instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following gentlemen duly proposed and seconded at the last meeting were balloted for, and elected ordinary members—

H. M. Durand, Esq., C. S.

Captain E. A. Fraser, 3rd M. L. C.

C. W. Marshall, Esq.

The following are candidates for ballot at the next meeting—

J. C. Parker, Esq., Calcutta, proposed by J. Wood-Mason, Esq., seconded by Capt. J. Waterhouse.

W. J. Olpherts, Esq., proposed by Walter Bourne, Esq., seconded by W. E. Brooks, Esq., C. E.

Lieut. C. T. Bingham, Bengal Staff Corps, proposed by Lieut.-Col. J. Y. Gowan, seconded by Capt. J. Waterhouse.

Kumára Grischandra Sinha Bahádur, proposed by Bábu Rájendralála Mitra, seconded by Col. H. Hyde, R. E.

Bábu Jogeslchandra Dutt, proposed by Bábu Rájendralála Mitra, seconded by H. Blochmann, Esq., M. A.

Alexander Pedler, Esq., proposed by H. F. Blanford, Esq., seconded by H. B. Medlicott, Esq.

Col. W. E. Marshall, Bengal Staff Corps, D. P. W., Fyzabad, proposed by J. Ewart, Esq., M. D., seconded by Capt. J. Waterhouse.

W. G. Bligh, Esq., Asst. Engineer, Agra Canal, proposed by F. S. Growse, Esq., M. A., C. S., seconded by H. Blochmann, Esq.

Capt. W. F. Badgley, B. S. C., Deputy Superintendent Topographical Survey, proposed by Major H. H. Godwin-Austen, seconded by Capt. J. Waterhouse.

Lieut. R. G. Woodthorpe, R. E., Assistant Superintendent Topographical Survey, proposed by Major H. H. Godwin-Austen, seconded by Capt. J. Waterhouse.

The President announced that the Council have nominated Col. J. E. Gastrell as a Trustee of the Indian Museum, on behalf of the Society, in place of Dr. Stoliczka.

Mr. H. B. Medlicott exhibited a stone implement from the Ossiferous "Pliocene" deposits of the Narbadá valley.

Mr. Medlicott invited attention to the perfectly regular, pointed oval, form of the celt as proving it to be unquestionably manufactured. On the important point of geological position, it is equally satisfactory, having been dug by Mr. Hacket of the Geological Survey, out of the stiff clay on the bank of the Narbadá near Bhutrá, north of Gadarwara. Some twenty feet of ossiferous gravel rested on the clay; the whole being about one hundred feet below the present surface-level of the deposits. Dr. Falconer from first to last applies the term Pliocene to these beds and to their mammalian fossils, and with the conviction that human remains would be found in them.

Mr. Medlicott drew attention to the immense antiquity implied by the name Pliocene; and proved from Dr. Falconer's own writings that it had been knowingly applied by him, quite independently of its fixed meaning in the scale of geological formations, and simply as expressing for the mammalian fauna that approximation to existing forms by which relation, as applied to the molluscan fauna, the name was intended, and is universally used, to indicate the youngest Tertiary formations. Dr. Falconer pointedly noted the great distinctions of the old Narbadá fauna from that of the Siválíka, and its strong affinities with existing forms; nowhere insisting upon it as *specifically* Pliocene.

Mr. Medlicott further pointed out from purely geological considerations that no such antiquity could be assigned to the old alluvium of the Indian rivers; that he could not regard them as older than the late Pleistocene or Quaternary, *i. e.* on about the horizon of the implement-bearing gravels of the river-valleys of northern Europe.

Mr. Blochmann exhibited several rubbings and tracings of inscriptions received from Jaunpúr, Pánípat, and Muzaffarnagar, the former from General Cunningham, the latter from Mr. J. G. Delmerick, Dihlí, and Mr. A. Cadell, C. S. He said—

At the January meeting of the Society I exhibited a large number of Bengal inscriptions received from General Cunningham, and I now propose to exhibit, at this and subsequent meetings, his inscriptions from various places in the North-Western Provinces. I shall commence with the five inscriptions of the bridge over the Gumtí at Jaunpúr. The bridge was built in 975 (or 975-76) A. H., or A. D. 1567-1568, by a Kábulí architect (*ustádd*) of the name of Afzal 'Alí, at the cost of Mun'im Khán Khánán.* In the existing gazetteers, it is stated on the authority of the *Jaunpúr-námah* that the builder is Fahím, a freed man of Mun'im Khán; but we know from history that Fahím was a slave of Mun'im's successor, Mírzá 'Abdurrahím Khán Khánán (*Áin* translation, p. 338).

Jaunpu'r.

I.

خان خانان منعم عالم مدار * بست این پل را بتوفیق کریم
نام او منعم ازان آمد که هست * برخلاق هم کریم و هم رحیم
از صراط مستقیمش ظاهر است * شاه راهی سوی جنات النعیم
ره بتاریخش بری گر افکنی * لفظ بد را از صراط المستقیم
حق سبحانه و تعالی این بناء را در پناه خود دارد * قایله و کاتبه محمد
محسن المذنب ابن امیر هاشم ||

1. Khán Khánán Mun'im, the centre of the world, built this bridge by the grace of the Bountiful.

2. His name is Mun'im ['ono who confers benefits'], because he bestows favors upon mankind and shews mercy.

3. He has thus opened for himself a passage over the *Qirát i mustaqim*† towards the beautiful gardens of Paradise.

4. You will arrive at the date if you throw the word *bad* out of 'Qirátul-mustaqim.'

May God Almighty have this building in His keeping! The composer and writer of these verses is Muhammad Muhsin, a sinful man, son of Amír Hášhim.

The value of the letters of the words 'Qirátul Mustaqim' is 981, and-if we subtract the value of the letters of '*bad*,' i. e. 6, we get 981-6 = 975, A. H.. The metre of the verses is short *Ramal*.

II.

سپهر کرم خان خانان که باشد درش قبله جمله دلهای آگاه
پله بست از سنگ بروی دریا کزو بگذرند اهل دل کلاه و بیگاه
چو از فضل الله شد بسته این پل ازان گشت تاریخ آن فضل الله

* His biography will be found in my *Áin* translation, pp. 317, 384. The *tārīkh* given there is corrected below. Vide also Stewart's History of Bengal, p. 103.

† The faithful before entering Paradise have to pass over a bridge called *Qirát ul mustaqim*, 'the established path,' which leads over a bottomless pit, but is as narrow and as sharp as the edge of a sword.

* 1. The Khán Khánán of heavenly bounty, whose door is the cynosure of all wise hearts,

2. Built a stone bridge over the surface of the river, over which good people pass at all times.

* 3. As this bridge was built by the grace of God, its *tárkh* is the words 'Fazli allah' [the grace of God].

This gives 976 A. H. The metre is *Mutaqárib i sálim*.

III.

این عمارت عالی و اساس متعالی در ایام دولت حضرت السلطان الاعظم و
الخاقان المعظم مظهر آثار السلطان ظل الله ابو الغازی جلال الدین محمد اکبر
پادشاه از خالص مال صاحب همت خیریتی انعام یافت که نام و سال بنای و
انعامش هست این کل * بانیتی این منعم خان *

This lofty edifice and noble foundation was successfully completed in the reign of his Majesty, the great Sulṭán, the exalted Kháqán, in whom the marks of royalty appear, the shadow of God, Abul Ghází Jaláluddín Muhammad Akbar Pádisháh, at the private cost of the generous Lord. The following *tárkh* contains his name, and the year in which (the bridge) was built and completed—'The builder of this (is) Mun'im Khán.' [A. H. 975.]

IV.

این پل عالی باهتمام نتیجه نثایع العظام *** فی (۹) الانام خواجه نظام الدین
که *** [پسر] حضرت مخدومی اعظم اند قدسی سره العزیز و بهنرمندی نادر
العصر استاد افضل علی کابلی بانعام رسید ॥

This lofty bridge was completed under the superintendence of the effect of great effects [one word illegible] among men, Khwájah Shaikh Nizámuddín, who is the son of Hazrat Makhdúm i A'zam—may God sanctify his dear secret!—and by the skill of the master of the age, Ustád Afzal 'Alí of Kábul.

V.

The last inscription is a Rubá'í, of which, however, the first line is illegible. The last is—

تاریخ بنای آن چو چشم از غیب گفتند پل محمد منعم خان ۹۷۵

When I looked for a *tárkh* from the unseen world, (angels) said—'The bridge of Muhammad Mun'im Khán.' A. H. 975.

Maulawí Khairuddín of Alláhábád has given in his Jaunpurnámah the first two inscriptions, together with a description of the bridge itself.

In the third description, Akbar is called Abul Ghází, instead of Abul Fath.

2. Panípat.

Mr. J. G. Delmerick has sent to the Society a tracing of the following inscription from Pánípat.

* بانی این عمارت فیروز محمد لطف الله افغان بانی این خیر در عهد سلطان
السلطین سکندر شاه بهلول شاه سلطان بکرم باری تعالی توفیق یافت تا گنبد
حظیرہ بندگی شیخ المشائخ و الاولیاء شیخ جلال الحق و الشرع والدين قدس الله
سرة العزیز برآورد بتاریخ دوم ماه شوال سنه اربع و تسعمایه ۱۱

The builder of this edifice is Fīrūz Muhammad Latfullah, the Afghān. The builder of this religious edifice, during the reign of the King of Kings, Sikandar Shāh, son of Bahlūl Shāh, the king, was by the kindness of God vouchsafed the grace to erect the vault of the tomb of the revered Shaikh of Shaikhs and saints, Shaikh Jalāluddīn (the glory of truth, the law and the faith)—may God sanctify his dear secret! Dated, 2nd Shawwāl, 904. [13th May, 1499, A. D.]

Nothing is known of the builder. The saint, however, is a well-known personage, and all biographical works on Muhammadan Saints contain biographical notes of him. His full name is Shaikh Jalāluddīn, (son of) Mahmūd of Kāzarūn, a town in Persia; but his real name was Muhammad, son of Mahmūd, Shaikh Shamsuddīn Turk of Pāñipat having conferred on him the title of Jalāluddīn, 'the glory of the Faith.' He is the author of the *Zād ul-akbar*, and he was twice in Makkah. It is said that he daily fed one thousand people, and even during his hunting excursions, of which he was passionately fond, his table always contained miraculously food for one thousand people. Many miracles are related of him. He was in high favour with Fīrūz Shāh. Shaikh Jalāl died on the 13th Rabī' I, 765 (20th December, 1363) and lies buried, together with his five sons, in Pāñipat.

II.

Mr. Delmerick also sent a tracing of a Hindústānī inscription from Pāñipat. It seems that the tomb of Ibrāhīm Lodī was repaired in 1867 by the local authorities of that town; but unfortunately they have given the emperor Bābar a wrong name, calling him Ghiyāsuddīn Bābar, instead of Zahiruddīn Bābar.

* یہ قبر بادشاہ ابراہیم لودی کی ہے کہ بمقتالہ بادشاہ غیاث الدین بابر کے پانی پت
میں کلن جنگ میں ساتھ اپنی فوج کے قتل ہوا سنہ ۹۳۷ ہجری میں اور
یہ قبر سنہ ۱۸۶۷ عیسوی میں مرمت و درست ہوا ۱۱

Muzaffarnagar.

From A. Cadell, Esq., C. S., the following readings of inscriptions from Majherah and Mornah, connected with the Sayyids of Bārha* (Muzaffarnagar District).

* *Vide* Kitā translation, pp. 389 to 395; Journal, A. S. Bengal, for 1871, Pt. I, p. 260; Proceedings, A. S. Bengal, November, 1872, p. 166.

I.

پادشاه جرم مارا در گذار ما گنهگاریم تو آمرزگار
 تو نکوکاری و ما بد کرده ایم جرم بی اندازه ییحد کرده ایم
 تاریخ وفات سعادت مآب مرحومی مغفوری میران سید حسین پنجم شهر
 جماد الثانی سنه الف هجری *

1. O Lord, forgive our sins ; for we are sinners and thou art forgiving.

2. Thou art good, but we are wicked and have committed endless crimes.

The date of the death of Mirán Sayyid Husain, the good, who has obtained pardon and forgiveness, is the 5th Jumáda, II, 1000. [9th March, 1592.]

II.

در عهد محمد شاه پادشاه غازي این مسجد را معصومه زمان بی بی جہویر
 مبلغ نہ ہزار روپیہ در شهر صفر سنہ یکہزار و یکصد و سی و ہشتم ہجری
 مطابق سنہ ہشتم جلوس والا تعمیر کنانید *

From the Mosque at Mornah.

In the reign of Muhammad Sháh, Pádisháh i Ghází, this mosque was ordered to be built by the chaste lady of the age, Bibí Jhabbú, at the cost of nine thousand rupces, in the month of Çafar, 1138, [October, 1725], the eighth year of the auspicious accession.

Mr. Cadell writes—"This is one of the last of the substantial Sayyid buildings. Bibí Jhabbú was the wife of Nawáb Hasan Khán, an Imperial Bakhshí, during the reign of Muhammad Sháh. Mornah is a Chatraurí settlement, and the Mornah Sayyids with other Chatrauris came to the front when the Tihanpúris lost ground."

The following papers were read—

1. *On a new species of Kite, and notes on the genus Milvus generally.*—By ANDREW ANDERSON, Esq., F. Z. S., with a note by W. E. BROOKS, Esq., C. E.

(Received 5th June, 1873)

It is now nearly three years since I first recognized an undescribed species of *migratory* kite which appears to have escaped the notice of Indian Ornithologists, and the matter has been allowed to remain *sub judice* until I could be quite certain that the bird now brought before the public was really new to science. I have, however, alluded to it from time to time in a series of papers that have been published by the Zoological Society of London, ("Notes on the Raptorial birds of North Western India"), from which

the following extracts are taken, as giving some particulars relative to the habits of the bird in question.

"I have, however, specimens of a kite with all the characters of *Milvus major*, but considerably smaller. It is also a cold weather visitant, and is equally shy as the former. Mr. Brooks has examined these kites in my collection and agrees with me in referring them to another species: they may be *Milvus affinis*, or perhaps more probably *M. melanotis* of Temminck."

"Undoubtedly we have three species of kites in India, two of them being migratory." P. Z. S. 1872, p. 79.

"The small Marsh kites I have before referred to (p. 79) first made their appearance in ones and twos before the end of September; and they were then terribly wild; just as much so as *Milvus major*. Later in the season (December and January,) they became gregarious, and confined themselves to marshes and grassy swamps. As the season advanced, so their wariness seemed to wear off; and as the country dried up, they began associating with the village kites, till they became just as audacious as their allies *M. Govinda*.

"I have seen as many as fifty of the small Marsh kite on the wing at a time; and the conspicuous white or pale-buff patches under the wings suffice to distinguish them from the village kites at a glance."

"Early in the season the Marsh kites appear to keep to the open country, and then do not intermingle with the other species; but I have come across numerous places where villages are situated on the banks of swamps; and then, of course, both kinds are always to be seen together. They have now (14th March,) nearly vanished, and by the end of the month I do not think one will be left." P. Z. S. 1872, p. 623.

MILVUS PALUSTRIS, sp. nov.

The kite for which I have proposed this name, is somewhat smaller than *M. govinda*, Sykes; but in point of coloration it is very nearly a *fac-simile* of *M. major*, Hume; in fact a perfect miniature of that species.* While the amount of white under the wings, extending in some examples to two-thirds of the length of the primaries (confined, however, to the inner webs), and the rich rufous tone of the plumage generally, tend to assimilate *M. palustris* to *M. major*, these characters tend equally to separate the former from either of the other two species, viz., *M. Govinda* and *M. affinis*, Gould (P. Z. S. 1837); i. e., supposing the latter to be really worthy of specific distinction as an Indian bird.* There is also a considerable amount

* Mr. Blyth, in his "Commentary on Dr. Jerdon's 'Birds of India.'" (Ibis, 1866; p. 248), does not appear to think that the ordinary Indian Kite is separable into two species:—"In every assemblage of Indian Kites there is much disparity of size, some males being considerably smaller than the largest females; and the former would

of white and pale buff about the head and neck of the new bird, which is never present in its common congener *M. govinda*, from which it has not hitherto been discriminated.

The following are the dimensions of specimens that have been forwarded to illustrate this paper :

No. 1 ♀ Etawah district,	Length	22 in. ;	wing	17 in.
No. 2 ♀ Mainpuri district,	"	21 " ;	"	16½ "
No. 3 ♂ Etawah district,	"	20½ " ;	"	16 "
No. 4 ♂ Sháhjahánpúr district,	"	20 " ;	"	16 "

These measurements correspond with those of the Australian bird (*M. affinis*, Gould), which Mr. Gurney states he has received from parts of India, and which Mr. Hume* separates from *M. Govinda (vera)*, on account of "its *duller tints*, and smaller size."† The italics are mine. The new kite, therefore, cannot be the Australian bird (*M. affinis*), for, so far from approaching *M. Govinda* in coloration, it differs widely from that species : (1) by its *rufous toned* plumage, and (2) by the *white under the wings* ; which are characteristic of our new bird.

Neither can it be *M. melanotis*, Temminck, as I at one time supposed it might have been ; for Mr. Gurney informs me (in epist.) that specimens of this kite, which he has received from Japan, vary from 25 to 28½ inches in length (according to sex), with wings from 18½ to 21½ inches long, which measurements are exactly similar to those of *M. major*.‡ For the sake of comparison I forward a ♂ specimen of this kite, to shew the vast difference in size between it and our new bird ; and yet how close they are in point of colour.

At one time I was inclined to believe that the subject of the present paper was perhaps only the young of *M. Govinda* ; but a comparison with a Futtehghurh-born bird,§ will shew that this is quite impossible. The difference between the two species is sufficiently striking to be quite apparent to an ordinary observer.

seem to be undistinguishable from the Australian *affinis* ; but I am not disposed to accept the opinion that there are two separable races of *Milvus* in the Indian and Indo-Chinese subregions." &c., &c.

* Cf. "Stray Feathers," 1873, p. 161.

† The examination of a large series of the common kites clearly shews that it is quite impossible to say where *affinis* ends, and where *Govinda* begins. As to the "duller tints" of the former, I find that this peculiarity is far from constant ; and as to its "smaller size," I would give it as my opinion, that merely nominal difference in this respect in a bird measuring twenty one inches long cannot be sufficient to constitute a distinct species.

‡ Mr. Hodgson was aware of the existence of this large kite, as his drawings contain figures of it under the name of "*Milvus Indicus*," Hodgson.

§ Also sent with this paper.

The small Marsh kite is an extremely abundant species in the N. W. Provinces, and its appearance in September or October is a sure harbinger of the cold weather. It is gregarious, associating at times in large flocks; and in this respect it differs from its larger ally (*M. major*) which, as a rule, is a solitary bird.

Early in the season they are both extremely shy, thus affording a marked contrast to the permanently resident species (*M. Govinda*).

The summer habitat of *M. palustris* is still a desideratum. I have satisfied myself beyond doubt that it does not breed within our limits, numerous dissections proving the bird to be a late breeder.

In concluding my remarks on this subject, I wish to place on record the probable existence of another species of kite, considerably *black-er* and *larger* than the ordinary run of full sized *Govindas*. I have one specimen of this kite, a ♂ of the same dimensions as *M. major*, but differing in the shape of its nostril (a characteristic feature in Raptorial birds) from *all the other Indian species of Kites*.

At first I inclined to the belief that in this bird I had got hold of the European *M. migrans*, Bodd; the more so, as Mr. Gurney has recorded it from Afghanistan. But on comparing this large black kite with a Russian-killed *M. migrans*, the difference between the two birds is very marked. The former was a breeding bird, with testes enormously developed, or I might have been inclined to have considered it merely a melanoid variety of *M. major*.

Note by W. E. Brooks.

I quite agree with my friend, Mr. Anderson, in separating this kite. *

The tendency to pale buff under the wings is a remarkable characteristic of *M. palustris*, to which *M. major* is not subject; and in this respect it is not always an "exact miniature" of its large congener.

I have long known this kite, and once imagined it to be *M. melanotis*, Temm. and Schl. but the latter is now, I think, almost proved to be identical with *M. major*, Hume. I quite believe in their identity; for a bird so strikingly resembling *M. major* as *M. melanotis* does according to all accounts, *is sure to have a corresponding amount of white under the wing*. The alleged want of white in the wing of the latter is the only difference observed. This amount of white under the wing of *M. major* is variable; sometimes it is clear white, at other times only a mottling of white on the basal half of the inner webs of the primaries.

With reference to the idea entertained by Messrs. Hume and Anderson that there are two species of dusky kites of the *Govinda* type in India; I cannot believe in anything of the sort. I have one of the larger dusky kites referred to by Mr. Anderson, and I have examined his bird too; I have also

collected kites numerous from Etáwah to Asansol, places distant apart about 700 miles, and I cannot find any specific difference in plumage. The wing varies from 16 to 18 inches in length; but this is no greater variation than *M. major* is subject to; and the range of wing in *Aquila bifasciata* is from 20 to 24 inches, according to specimens in my collection. The dusky kites can be obtained *with any length of wing between 16 and 18 inches*, but they are one and all precisely identical in other respects. *The male, too, is often quite as large as the average female.* This should be taken into account before making another species of Govind kite. I do not agree with Mr. Anderson regarding the difference of nostril. Many of my smallest Govind kites have the same nostril. It is just such an amount of slight individual variation, as regards nostril, as I have observed in other species.

I think, therefore, that we may safely conclude that we have only three true kites in India: *M. melanotis*, *M. Govinda* or *affinis*, and *M. palustris*.

I have never seen Indian-killed examples of *M. migrans* or *M. Ægyptius*.

With regard to the types of *M. Govinda*, Mr. Gurney in a letter to me, dated 5th July, 1872, says, "Many years ago I examined in the Museum of the East India Company the two type specimens from which the late Col. Sykes originally described his *M. Govinda*. One of them appears to me to be identical with the Australian *M. affinis*, the other to be a somewhat larger bird, and I think of the form intermediate between *M. melanotis* and *M. affinis*, if such there really be as a distinct race."

It would appear from the foregoing that there is some difference between the two type birds of *M. Govinda*; and a critical re-examination of them is much to be desired. For my own part, I am not at all satisfied that *Milvus Govinda* is not *Milvus melanotis*.

The original description of Sykes' species is to be found in P. Z. S., 1832, p. 81.

Only two dimensions are given; "Longitudo corporis 26 unc.; and, "caudæ 11." *The former is, I think, fatal against M. Govinda being the bird we now recognize as that species, i. e., the common Calcutta kite.* The following are total lengths of several kites, the sexes of which were carefully ascertained:

			inches.
<i>M. major</i>,	♂	.....	25½
"	"	♀	25½
"	"	♀	25½
"	"	♀	25½
"	"	♀	24½
"	"	-	24½

<i>M. Govinda</i>	♂	.....	21	
"	"	♂	.....	22
"	"	♂	.....	23½
"	"	♂	.....	22½
"	"	♂	.....	22 to 23
"	"	♀	.....	22 to 25
<i>M. major</i> ,	♂ or ♀	...	27·7 to 29	} according to Mr. Hume in 'Stray Feathers.'

From the above dimensions it is apparent that a bird, in the flesh measuring 26 inches, cannot be our common kite. The probability is greatly in favour of its being *M. melanotis*. 26 in. could only be obtained by measuring a stretched skin of our common kite, and this an accomplished naturalist like Col. Sykes would hardly have done.

I have heard that Col. Sykes' types are all carefully packed away in boxes, and it is to be hoped moths' eggs have not been packed up with them. How necessary it is that these valuable types should be in some museum where they might be properly cared for, and accessible. In the British Museum they would be well cared for, and thither they ought to be sent.

There are several of Col. Sykes' types which require re-examination, and especially that of *Sylvia Rama*. Dr. Jerdon was under the impression that the true *S. Rama* was the smaller and more rufous bird separated by Mr. Hume as "*Jerdonia agricolensis*," after examining a series of both birds which I had prepared. The dimensions of Col. Sykes' original description favour Dr. Jerdon's view; for they decidedly indicate the smaller bird. I may mention in passing that the larger bird which Mr. Blyth regarded as *Sylvia Rama*, has been identified by Dr. Tristram with *Sylvia caligata*, Licht.

I have digressed thus from the subject in hand to shew the necessity for Sykes' types being accessible; and I know from experience, that it is a dangerous thing to shut up specimens in the tightest of boxes, unless they have been previously thoroughly baked. The chances are that all these valuable types have been reduced to a confused mass of feathers, or rather of the remains of feathers.

2. *Notes on the Pteropi of India and its Islands, with descriptions of some new or little known species.*—By G. E. DOBSON, B. A., M. B., Staff Surgeon H. M.'s British Forces.

(Abstract.)

According to Drs. Peters' and Gray's lists of the species of *Pteropus* no less than fifty species exist of which half inhabit a few small islands in the Malay Archipelago, and one species only *Pt. medius*, Temm. is known from the Continent of India and Burma.

The writer believes that many of the so-called species which go to make up the large number from Malayana have been founded on insufficient grounds, as several are distinguished solely by the colour of the fur, a most fallacious character in many orders of Mammals, and especially so in the *Chiroptera*. Distinctions based on the shape of the skull and size and form of the teeth are not satisfactory, for it should certainly be possible to determine the species to which a given vertebrate animal belongs without first finding it necessary to kill and make a skeleton of it.

A very valuable character for distinguishing the species of *Pteropi*, as well as other species of *Chiroptera*, is shown to exist in the shape and relative size of the ears, the importance of which has not been sufficiently recognised. This if taken in connection with accurate measurements will, in most cases, if not in all, be found quite sufficient.

Pt. nicobaricus, Fitz. et Zel., from the Andaman and Nicobar Islands, is redescribed as it is impossible to recognise the species from the original description in the Zoology of the Novara expedition.* This species is at once distinguished from *Pt. medius* by the form of its ears which are rounded, not acutely pointed at the tips.

A well-marked variety of *Cynopterus marginatus*, *C. andamanensis*, is described, and *Cynopterus Sherzeri*, Fitz. et Zel. from the Nicobars distinguished from other species of the genus, the original description of this species being quite useless as a means of diagnosis.

A new species of *Cynonycteris* from the Malay Archipelago, *C. minor*, is also described. This species is readily distinguished from *C. amplexicaudatus*, Geoff. by its small ears which are also proportionately much narrower.

Other species of Indian *Pteropi* are redescribed, and a new genus, *Eonycteris*, is established for the reception of *Macroglossus spelæus*, Dobson.

3. *Description of a new species of Vespertilio from the North-Western Himalaya.*—By G. E. DOBSON, B. A., M. B.
(Abstract.)

The new species for which the name *Vespertilio murinoides* is proposed, resembles *V. murinus*, L. but is distinguished by its smaller size, by the shape of the ears and tragus which is very acutely pointed, not subacute, as in the latter species, and by the small size of the first upper premolar.

Both papers will appear in the Journal.

4. *Note on certain species of Phasmida hitherto referred to the genus Bacillus.*—By JAMES WOOD-MASON, of Queen's College, Oxford.

The discovery which I have to announce, viz., that the true males of *Bacillus insignis* and its allies are to be sought in insects of the type of

Lonchodes Stilpnus, Westw., *Lonchodes pseudoporus*, Westw. *Lonchodes Russellii*, Bates, &c., affords another instructive illustration not only of the extreme imperfection of our knowledge of this family of Orthopterous Insects, but also of the utter futility of any attempt satisfactorily to distribute the species composing it into genera, until we shall be in possession of the true pairs of many more of the described species.

In 1869 M. Henri de Saussure* proposed, prematurely as it turns out, to divide the genus *Bacillus* into three subgenera, one (*Bacillus*) for the reception of *B. Rossii* and its allies, another (*Ramulus*) for *B. humilis*, Westw., *B. carinalatus*, Sauss., &c., and a third (*Baculum*) for *B. cunicularis*, Westw., *B. ramosus*, Sauss., &c.; and in the first part of my memoir on the *Phasmidæ*,† I provisionally referred to the last named subgenus one known and three new species, pointing out that these agreed together in having the last dorsal abdominal segment longitudinally grooved, and mentioning, in the description of each species, the presence, in the posterior border of this segment, of an emargination filled by a well-developed supra-anal plate which is invariably to be found in the females of all species of *Lonchodes*. I have long felt convinced that the insect of which a description is appended, was the male of my *Bacillus* (*Baculum*) *insignis* but have thought it better to wait for evidence confirmatory of the fact. This has, at length, reached me from Ceylon, thanks to Mr. Hugh Nevill, C. C. C., who has been kind enough to send me, amongst other species of great interest and value, the two sexes of an insect agreeing admirably with M. de Saussure's‡ description of *L. pseudoporus*, Westw.

The discovery of the male of *B. insignis* will obviously also necessitate the transference of the following species to the genus *Lonchodes*:—*Bacillus cunicularis* et *Hyphereon*, Westw. *B. patellifer* et *scytale*, Bates, *B. ramosus*, Sauss., *B. Penthesilea* et *furcillatus*, Wood-Mas.; and I strongly suspect that *B. Westwoodi* et *scabriusculus* will eventually have to follow them to the same genus.

LONCHODES INSIGNIS.

♀ *Bacillus* (*Baculum*) *insignis*, Wood-Mason, Journ. A. S. B., Vol. XLII, 1873, pp. 61, 62, pl. V. fig. 1, 2.

♂ Body of excessive tenuity. Antennæ perfectly filiform, 24-jointed, reaching nearly to the apex of the anterior femora. The head is almost a complete miniature of that of the female and in the specimen from which the dimensions given below are taken has two minute tubercles between the eyes representing the well-developed horns of the opposite sex. Three dark dorsal

* Mém. Orth. Fasc. II, pp. 111, 112.

† Journ. A. S. B., 1873 Pt. II, No. I.

‡ Op. cit., pp. 120, 121.

streaks, one median and two lateral, pass along the whole length of the body from the head to the end of the 6th abdominal segment. Both meso- and metathorax are dilated at either end but especially at the insertion of the legs, and have each a raised median dorsal carina. The six basal abdominal segments are slightly expanded at each end, as in spirit specimens of the female; the 7th and 8th are shorter than the preceding, sub-equal, and gradually widen, the former from the base to the apex, the latter from the apex to the base; the last is scarcely longer than these, and cleft for rather more than a third of its length, but the sides of the cleft are so closely approximated that no hiatus is visible as in many other species; seen from the side, this segment terminates in an obtuse, scarcely deflexed tip. The legs are devoid of all traces of the foliaceous lobes so conspicuous in the female, but present the same general structure; the intermediate femora are just perceptibly curved, and the four posterior tibiæ have a few inconspicuous spinules towards the apical end.

Total length, 4 in. $7\frac{1}{2}$ lin., ant. $15\frac{1}{2}$, head 2, proth. $1\frac{3}{4}$, mesoth. 12, metath. 11, abd. $24 + 6 = 30$ lin., ant. legs $19 + 22 + 6\frac{1}{2} = 4$ in., inter. legs $12 + 12 + 5 = 2$ in. 5 lin., post. legs $15 + 16 + 4\frac{1}{2} = 3$ in.

Hab. Samagooting, Naga Hills, with the female. Collected by Captain Butler.

The author exhibited the specimens referred to in the preceding note, and also invited the attention of the meeting to the following fine series of Australian insects belonging to the same family:

Lonchodes, n. sp., ♂ ♀. Hab. N. Queensland.

Lopaphus coccophagus, G. R. Gray, ♂. Hab. Samoa.

Cyphocrania Goliath, Gray, ♀.

Cyphocrania Enceladus, Gray, ♂ ♀.

Acrophylla violascens, Leach, ♂ ♀.

Podacanthus Typhon, Gray, ♂ Hab. Champion Bay, N. W. Australia.

Podacanthus viridiroseus, Curtis, ♀.

Tropidoderus Childreni, Gray, ♂ ♀ et. ♀ var.

Extatosoma tiaratum, MacLeay, ♂ ♀ et larva.

The reading of the following papers was postponed.

1. Authorities for the History of the Portuguese in India. By T. W. H. Tolbort, Esq., C. S.

2. Note on two copper-plate grants of Govinda Chandra of Kanouj. By Bábu Rājendralála Mitra.

LIBRARY.

The following additions have been made to the Library, since the meeting held in June, last.

Presentations.

*** Names of Donors in Capitals.

Monatsbericht, January, 1873.

Schott—Einige Zusätze und Verbesserungen zu seiner Abhandlung über die ächten Kirgisen. Borchardt—Untersuchungen über die Elasticität fester isotroper Körper unter Berücksichtigung der Wärme. Dove—Die meteorologischen Unterschiede der Nordhälfte und Südhälfte der Erde.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Bulletin, April, 1873.

E. G. Rey—Essai géographique sur le nord de la Syrie. Khiva. (Extrait d'un travail du Colonel Venioukof.)

THE GEOGRAPHICAL SOCIETY OF PARIS.

Actes, 3^e Ser., 33^e Année—1871-72.

M. Linder—Discours sur l'origine des aurores polaires.

THE NATIONAL ACADEMY OF SCIENCES AND ARTS OF BORDEAUX.

Zamidar-o-Prajá, (a Bengali pamphlet on the relations of landlord and tenant). By Nilakamala Mukerji.

THE AUTHOR.

Professional Papers on Indian Engineering, May, 1873.

A. Nielly—Report on experiments made on Kankar Mortars and Concrete. E. A. Sibold—Retrossion of level in canals. W. W. Culcheth—Quantity of water for various crops. Captain A. Cunningham—Transverse strain in pillars. Major H. Tulloch—Masonry conduits versus Iron pipes. Major H. Tulloch—History of the water supply of Bombay.

THE EDITOR.

The Calcutta Journal of Medicine, March and April, 1873.

THE EDITOR.

The Christian Spectator, Vol. II, No. 24.

THE EDITOR.

Rámáyana, Vol. 3, No. 7.

THE EDITOR.

Vetála Panchavinshati.

BABU RA'JENDRALA'LA MITRA.

Memorandum on the Metals and Minerals of Upper Burmah. By Captain G. A. Strover.

The Flora Sylvatica, part XXVI, by Major R. H. Beddome.

Kitab-ul-Twazih fi Asú-lil-Ashri, (Human Anatomy in Arabic).

THE GOVERNMENT OF INDIA.

Palæontologia Indica, Vol. I, Part 1. Jurassic Fauna of Kutch.
W. Waagen—The Cephalopoda (Belomnitidæ and Nautilidæ).

THE GEOLOGICAL SURVEY OF INDIA.

Purchase.

The Indian Antiquary, June, 1873.

L. Rice—Nágamangala Copper-plate Inscription. *W. Ramsay*—Sapta, Srínga.
Capt. S. B. Miles—Archæological remains in Mekran. *Dr. Bühler*—On a Prakita
Glossary entitled Paiyalachhi. *Rev. F. Kittel*—Coorg Superstitions. *W. F. Sinclair*
—Notes on Natural History. *Dinshah Ardeshir Taleyarkhan*—Legend of Vellur.
Three Copper-plate grants from the Krishna district. Archaeology of Belári district.

Exchange.

Nature, Nos. 184-187.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1873.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.107	29.455	29.325	0.130	87.6	99.0	82.5	16.5
2	.412	.471	.327	.144	91.1	103.0	81.0	19.0
3	.506	.592	.456	.136	88.8	95.2	86.0	9.2
4	.577	.661	.522	.139	88.1	91.2	83.0	11.2
5	.619	.672	.558	.114	89.3	96.4	81.5	11.9
6	.617	.682	.529	.153	89.1	96.5	82.0	14.5
7	.583	.649	.509	.140	88.1	95.0	82.6	12.4
8	.556	.602	.500	.102	88.1	95.6	82.0	13.6
9	.561	.603	.499	.104	88.5	96.2	82.0	14.2
10	.554	.602	.467	.135	80.1	97.0	82.0	15.0
11	.478	.537	.399	.138	88.4	95.4	83.0	12.4
12	.415	.477	.326	.151	89.0	98.7	83.5	15.2
13	.424	.494	.370	.124	85.9	98.7	78.0	20.7
14	.462	.511	.391	.120	83.6	92.9	78.5	14.4
15	.451	.495	.393	.102	85.4	91.5	81.2	10.3
16	.487	.535	.432	.101	80.8	83.5	78.5	5.0
17	.505	.548	.451	.097	83.2	90.7	79.0	11.7
18	.476	.521	.411	.110	85.1	92.7	78.8	13.9
19	.490	.531	.442	.089	86.3	93.0	80.0	13.0
20	.491	.531	.435	.096	88.8	96.2	83.3	12.9
21	.491	.526	.437	.089	89.2	96.8	83.5	13.3
22	.486	.542	.426	.116	88.8	98.5	79.5	19.0
23	.533	.601	.491	.110	86.9	95.5	79.8	15.7
24	.542	.601	.488	.113	89.1	95.0	81.0	11.0
25	.517	.566	.452	.114	90.2	98.5	84.2	14.3
26	.472	.518	.409	.109	92.1	102.3	84.5	17.8
27	.492	.547	.422	.125	92.4	102.8	85.3	17.5
28	.537	.583	.457	.126	89.3	99.8	81.0	18.8
29	.543	.591	.470	.121	88.0	97.2	82.6	14.6
30	.563	.600	.502	.098	85.7	93.7	82.5	11.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	81.3	6.3	77.5	10.1	0.925	9.84	3.68	0.73
2	83.3	8.1	78.4	13.0	.952	10.04	5.06	.67
3	84.1	4.7	81.3	7.5	1.043	11.06	2.94	.79
4	83.4	5.0	80.4	8.0	.014	10.76	3.08	.78
5	83.5	5.8	80.0	9.3	.001	.62	.59	.75
6	82.4	6.7	78.4	10.7	0.952	.08	4.01	.71
7	81.6	6.5	77.7	10.4	.931	9.90	3.82	.72
8	81.1	7.0	76.9	11.2	.908	.64	4.08	.70
9	81.5	7.0	77.3	11.2	.919	.76	.12	.70
10	81.9	7.2	77.6	11.5	.928	.83	.29	.70
11	82.0	6.4	78.2	10.2	.916	10.05	3.79	.73
12	82.5	6.5	78.6	10.4	.958	.17	.91	.72
13	80.1	5.8	76.0	9.9	.882	9.41	.46	.73
14	79.7	3.9	77.0	6.6	.910	.75	2.28	.81
15	82.0	3.4	79.6	5.8	.989	10.56	.12	.83
16	79.5	1.3	78.6	2.2	.958	.34	0.73	.93
17	80.2	3.0	78.1	5.1	.943	.12	1.77	.85
18	81.3	3.8	78.6	6.5	.958	.23	2.34	.81
19	82.0	4.3	79.0	7.3	.970	.35	.67	.80
20	84.0	4.8	81.1	7.7	1.037	.99	3.01	.79
21	83.5	5.7	80.1	9.1	.005	.64	.52	.75
22	82.7	6.1	79.0	9.8	0.970	.29	.71	.74
23	79.9	7.0	75.7	11.2	.873	9.30	.95	.70
24	83.2	5.9	79.7	9.4	.992	10.53	.59	.75
25	82.9	7.3	78.5	11.7	.955	.10	4.49	.69
26	83.2	8.9	77.9	14.2	.937	9.88	5.53	.64
27	84.6	7.8	79.9	12.5	.998	10.50	.04	.68
28	82.9	6.4	79.1	10.0	.973	.32	3.89	.73
29	83.4	4.6	80.6	7.4	1.021	.86	2.82	.79
30	82.3	3.4	79.9	5.8	0.998	.65	.15	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1878.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.526	29.649	29.413	0.236	84.1	88.5	79.0	9.5
1	.514	.631	.389	.242	83.9	87.8	79.2	8.6
2	.502	.616	.382	.234	83.7	87.0	79.2	7.8
3	.491	.609	.383	.226	83.5	86.7	79.0	7.7
4	.490	.612	.394	.218	83.3	86.5	79.0	7.5
5	.502	.630	.405	.225	83.2	86.2	79.0	7.2
6	.514	.634	.410	.224	83.3	86.4	78.8	7.6
7	.531	.660	.434	.226	84.3	87.0	79.9	7.1
8	.545	.672	.433	.239	86.1	89.2	79.5	9.7
9	.549	.670	.452	.218	88.2	92.0	78.6	13.4
10	.547	.665	.440	.225	90.4	95.2	78.5	16.7
11	.541	.653	.434	.219	92.0	96.7	78.5	18.2
Noon.	.527	.637	.405	.232	93.6	98.5	78.8	19.7
1	.507	.617	.372	.245	94.6	100.4	79.4	21.0
2	.486	.595	.356	.239	94.8	102.0	80.3	21.7
3	.464	.578	.338	.240	95.0	103.0	81.0	22.0
4	.451	.559	.325	.234	94.3	102.6	81.3	21.3
5	.452	.558	.338	.220	92.4	101.5	81.0	20.5
6	.463	.570	.347	.223	89.6	98.8	78.0	20.8
7	.482	.604	.362	.242	87.6	94.0	78.0	16.0
8	.506	.630	.391	.239	86.5	91.7	78.5	13.2
9	.525	.682	.410	.272	85.6	90.4	79.0	11.4
10	.541	.666	.428	.238	84.7	89.0	79.0	10.0
11	.541	.666	.428	.228	84.4	88.7	79.0	9.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	81.3	28	79.3	4.8	0.979	10.48	1.73	0.86
1	81.4	2.5	79.6	4.3	.989	.60	.53	.87
2	81.4	2.3	79.8	3.9	.995	.66	.41	.88
3	81.3	2.2	79.8	3.7	.995	.66	.34	.89
4	81.2	2.1	79.7	3.6	.992	.63	.30	.89
5	81.2	2.0	79.8	3.4	.995	.69	.20	.90
6	81.4	1.9	80.1	3.2	1.005	.77	.16	.90
7	81.9	2.4	80.2	4.1	.008	.79	.49	.88
8	82.5	3.6	80.0	6.1	.001	.68	2.27	.83
9	82.9	5.3	79.7	8.5	0.992	.53	3.23	.77
10	82.9	7.5	78.4	12.0	.952	.06	4.61	.69
11	83.3	8.7	78.1	13.9	.943	9.93	5.43	.65
Noon.	83.4	10.2	77.3	16.3	.919	.66	6.42	.60
1	83.6	11.0	77.0	17.6	.910	.53	7.02	.58
2	83.6	11.2	76.9	17.9	.908	.51	.14	.57
3	83.7	11.3	76.9	18.1	.908	.51	.23	.57
4	83.5	10.8	77.0	17.3	.910	.55	6.86	.58
5	82.9	9.5	77.2	15.2	.916	.65	5.89	.62
6	82.2	7.4	77.8	11.8	.934	.89	4.44	.69
7	81.6	6.0	78.0	9.6	.940	.99	3.53	.74
8	81.6	4.9	78.7	7.8	.961	10.24	2.86	.78
9	81.5	4.1	78.6	7.0	.958	.23	.53	.80
10	81.0	3.7	78.4	6.3	.952	.19	.23	.82
11	81.3	3.1	79.1	5.3	.973	.42	1.89	.85

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1873.*

Solar Radiation, Weather, &c.

	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure th	Daily Velocity Miles
1	145.0	0.36	S E	4.0	137.4
2	144.0	.	S E, W S W & S	...	172.8
3	143.0	0.07	S S W & S	1.0	279.1
4	137.0	.	W S W	2.0	322.0
5	146.0	.	W by S & S	...	280.1
6	147.0	.	S by W & S	0.2	288.6
7	145.0	.	S S W & S	0.5	282.0
8	141.0	.	S & S S W	0.6	257.0
9	145.0	.	S & S by E	0.3	239.1
10	147.0	.	S by E & S S E	0.4	234.9
11	140.2	.	S S E & S E		179.6
12	144.0	.	S E & E by N		120.8

S to 6 A. M., \i to 10 A. M., \i to 5 P. M. S to 11 P. M. T between 1½ & 2½ & at 5 P. M. L at 2 & 4 A. M. R from 1½ to 2½ P. M.
\i to 3 A. M., S to 7 A. M. \i to 7 P. M. S to 11 P. M.
S to 10 A. M., \i to 7 P. M. O to 11 P. M. T at 8½ A. M. L on N W at 8 and 9 P. M. Slight R from 6½ to 9½ at 11½ A. M. & 7½ P. M.
O to 6 A. M., S to 10 A. M. \i to 2 P. M. \i to 9 P. M. O to 11 P. M. L at 11 P. M. D at 11½ P. M.
O to 7 A. M., \i to 2 P. M. \i to 5 P. M. \i to 11 P. M.
\i to 7 A. M., \i to 6 P. M. S to 11 P. M. L between 7 & 8 and at 10 P. M. D between 8 and 9 P. M.
S to 1 A. M., \i and \i to 3 A. M. O to 8 A. M. \i to 6 P. M. B to 9 P. M. \i to 11 P. M.
\i to 5 A. M., \i to 10 A. M., \i to 6 P. M., \i to 11 P. M.
\i to 8 A. M., \i to 7 P. M. B to 11 P. M.
B to 4 A. M., \i to 7 A. M., \i to 5 P. M., \i to 11 P. M.
\i to 2 A. M. S to 9 A. M., \i to 3 P. M. \i to 11 P. M. L on N E between 7 & 8 P. M.
\i to 3 A. M. S to 8 A. M., \i to 5 P. M. S to 11 P. M. T at 4½ P. M. L on S W from 8 to 10 P. M. D at 5½ A. M. 3½ & 4½ P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb.	Mile.	
13	136.5	1.64	SE & W	9.0	102.1	S to 6 A. M., \i to 10 A. M. S to 3 P. M. O to 11 P. M. High wind between 3½ & 4½ P. M. T & L between 4 & 5 P. M. R at 4, 5 & 7 P. M.
14	138.2	0.86	W S W & Variable	4.3	166.9	O to 9 A. M., \i to 4 P. M. O to 11 P. M. High wind from 5½ to 5¾ P. M. T between 2 & 3 A. M. & from 4 to 5½ P. M. L between 2 & 3 A. M., & from 5½ to 10 P. M. R at 2½ A. M., & from 5½ to 8 P. M.
15	121.0	...	SE & Variable		97.6	O to 11 A. M. S to 11 P. M. T at 3½ P. M.
16	...	0.06	E & S		90.0	O to 6 P. M. S to 11 P. M. T at 9½ A. M. L on W at 8 P. M. Light R after intervals.
17	137.0	0.50	S & S W	2.8	81.2	S to 11 A. M., \i to 6 P. M. O to 8 P. M. B to 11 P. M. Brisk wind between 6½ & 7 P. M. Slight R at 3½, 7 A. M. & between 7 & 8 P. M.
18	139.0	0.43	S S W & S W		131.9	B to 3 A. M., \i to 7 A. M., \i to 12 A. M., \i to 3 P. M. S to 11 P. M. L at 8 & 9 P. M. T & R between 9 & 10 P. M.
19	139.0	...	S S W & S W		155.9	S to 8 A. M., \i to 4 P. M. S to 11 P. M. L at 8 P. M.
20	141.5	...	S W & S		113.1	S to 2 A. M. O to 7 A. M., \i to 9 A. M., \i to 12 A. M., \i to 5 P. M. O to 11 P. M. L on N E at 8 P. M.
21	140.0	...	S S W & S W		177.9	O to 2 A. M. S to 8 A. M., \i to 4 P. M. S to 7 P. M. O to 11 P. M.
22	142.0	0.06	S S W & S W	9.0	117.8	\i to 12 A. M. S to 7 P. M. O to 11 P. M. High wind from 8 to 8½ & 9½ to 10 P. M. T at 9½ P. M. L from 7 to 11 P. M. Light R at 8½ & 10 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning
E. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1873.*

Solar Radiation, Weather, &c.,

Ma rac o	Inch.	Rain Gauge ½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressu Daily Velocity	
146.0	0.02		S S W	0.5 154.7	O to 6 A. M., \i & \i to 2 P. M. \i to 7 P. M. S to 11 P. M. L at midnight & from 8 to 10 P. M. Light R at midnight & 9½ P. M.
24 145.0			S S W & S W	3.2 79.2	\i to 1 A. M. O to 6 A. M., \i to 1 P. M. S to 11 P. M. Brisk wind at 9½ P. M. L at 8 & 9 P. M. D at 4½ A. M.
138.5			N E & Variable.	73.8	O to 8 A. M. S to 12 A. M., \i to 11 P. M.
145.0			N W & S by W	106.9	B to 2 A. M., \i to 8 A. M. B to 11 A. M., \i to 6 P. M. B to 11 P. M. L on N at 10 P. M.
27 145.6			S by W & S	108.2	Chiefly B.
28 143.9	0.30		S & S S W	4.3 169.6	S to 5 A. M., \i to 11 A. M. Clouds of different kinds to 4 P. M. O to 11 P. M. High wind between 5½ & 5½ P. M. T at 6 P. M. L from 6 to 9 P. M. Slight R from 6 to 8 P. M.
29 142.0			S S W & S S E	0.9 139.8	B to 1 A. M. S to 8 A. M., \i & \i to 3 P. M. S to 7 P. M. Q to 11 P. M. T from 2½ to 4½ P. M. D at 4 & 6½ P. M.
30 136.8			S & S E	0.4 121.6	S to 5 A. M., \i to 7 A. M., \i to 12 A. M. O to 4 P. M. S to 8 P. M. O to 11 P. M. T from 12½ A. M., to 2½ P. M. L at 2½ P. M. D at 12½ A. M. 1 & 3 P. M.

\i Cirri — i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi,
\i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.508
Max. height of the Barometer occurred at 9 P. M. on the 6th	29.682
Min. height of the Barometer occurred at 4 P. M. on the 1st	29.325
<i>Extreme range</i> of the Barometer during the month	0.357
Mean of the daily Max. Pressures	29.561
Ditto ditto Min. ditto	29.443
<i>Mean daily range</i> of the Barometer during the month	0.118

Mean Dry Bulb Thermometer for the month ...	87.9
Max. Temperature occurred at 3 P. M. on the 2nd	103.0
Min. Temperature occurred at 6 & 7 P. M. on the 13th	78.0
<i>Extreme range</i> of the Temperature during the month	25.0
Mean of the daily Max. Temperature ...	96.1
Ditto ditto Min. ditto, ...	82.0
<i>Mean daily range</i> of the Temperature during the month	14.1

Mean Wet Bulb Thermometer for the month	82.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	5.7
Computed Mean Dew-point for the month	78.8
Mean Dry Bulb Thermometer above computed mean Dew-point	9.1

	Inches.
Mean Elastic force of Vapour for the month	0.964

●

	Troy grain.
Mean Weight of Vapour for the month	10.25
Additional Weight of Vapour required for complete saturation	3.39
Mean degree of humidity for the month, complete saturation being unity	0.75

	°
Mean Max. Solar radiation Thermometer for the month	141.4

	Inches.
Rained 16 days,—Max. fall of rain during 24 hours'	1.64
Total amount of rain during the month	4.30
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	3.44
Prevailing direction of the Wind	S. S. W & S.

* Height 70 feet 10 inches above ground.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR AUGUST, 1879.

The Monthly General Meeting of the Society was held on Wednesday, the 6th instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From the Government of India—

A copy of "Report of a Tour made by Captain Miles to Kedj and Punjgoor and his return *viâ* Kurrachi."

A copy each of *Æsop's Fables* and the Gospel of St. Luke, translated into the Swaheli language by Dr. Steere, Zanzibar.

A copy of a "Diary of a Journey from Bunder Abbas to Baghdad, *viâ* Seistan, Meshed and Teheran" by Mr. G. Rozario, late in medical charge of the Seistan Mission.

2. From the Imperial Government of Brazil—A copy of a work entitled "Climat, Géologie, Faune, et Géographie Botanique du Brésil," by Mr. E. Liais.

3. From the Directors of the Batavian Society of Arts and Sciences two copies of "Photographien naar Oudheden van Java, door J. van Kinsbergen."

The following letter accompanied the donation—

'We have the pleasure to inform you that through the Netherlands India Steam Navigation Company we have forwarded to the address of your Society, as per enclosed bill of lading, a case containing a collection of photographs representing part of the antiquities of Java.

'In the 33rd volume of the Transactions of our Society will be found an elaborate monograph on Hinduism in Java, a posthumous work of the Rev. J. F. G. Brumund, Protestant Minister at Batavia, who, at the suggestion of

our Society, was entrusted by the Government of Netherlandish India with the task of visiting and describing the remains of the Hindu period, but who unfortunately was prevented by his untimely decease from accomplishing his studies, leaving unfinished a work which, when completed, would unquestionably have become one of the most interesting sources of our knowledge of the pre-Mahomedan period of Java.

‘Together with the proposal of our Direction to entrust to the Rev. J. F. G. Brumund the description of the various monuments, we called the attention of the India Government to the necessity of having the monuments, at least the most interesting of them, reproduced by an able photographer, and according to our advice, Government made choice of Mr. v. Kinsbergen, who under our control and according to our instructions has been occupied for some years in forming the collection of which a copy is now presented to your learned Society through our instructions, but in the name of the Government of Netherlandish India.

‘The photographs are accompanied by a catalogue from which you will please to observe that only the smaller part of them has been described in the above quoted work of Mr. Brumund, a new copy of which will be found in the parcel, containing the latest publications of our Society, which we have at the same time forwarded to your address.

‘Nearly all the antiquities that have been found in the Residencies of Bagelen, Gidiri, &c., were photographed after the death of Mr. Brumund, and till now our endeavours to find a person capable of continuing the labours of our lamented colleague, have been unsuccessful. On the other hand however, Mr. v. Kinsbergen has again been commissioned by Government to complete the present collection of photographs by reproducing in detail that most splendid monument in the residency of Kadoe known to all students of Hindu art and history under the widespread name of the Boro Boedoer.

‘Some more remnants of the earlier period of history in that part of Java will be added to the collection, and through the liberality of our Government, the learned world in Europe will in a couple of years have at their disposal a nearly complete representation of the most remarkable remains of the Hindu period, which have escaped the mutilating hand of man, and the destructive influence of time and climate.’

The President drew the attention of the meeting to the unusually valuable and interesting nature of this fine collection of photographs and proposed a vote of thanks to the Batavian Society of Arts and Sciences.

Mr. Blochmann seconded the proposal, and it was carried unanimously.

4. From the French Minister of Marine, Paris.—A copy of “*Voyage d’Exploration en Indo-Chine*,” by M. M. de Lagrée and Garnier.

A vote of thanks to the French Department of Marine for this splendid work, proposed by the President, seconded by Mr. Blochmann, was carried unanimously.

Mr. Blochmann exhibited the following two coins forwarded to him for exhibition by the Rev. Mr. Carleton, Rúpar.

1. A *Qutbuddin Mubaraksháhi*, silver and copper. New variety. Square. Weight, 83.386 grains. A. H. 719.

OBVERSE.—*الامام الاعظم قطب الدنيا و الدين ابوالمظفر* ۷۱۹

REVERSE.—In a small circle *مباركشاه خليفة الله*
and along the four sides—*سلطان الوائق بالله امير المومنين*

Similar coins were published by Mr. Thomas, 'Chronicles,' pp. 179 to 183.

2. A coin struck by *Mu'izzuddin Mubarak Sháh*. Silver. New variety. Round. Weight, 74.812 grains. A. H. 833.

OBVERSE.—*السلطان الاعظم * مبارك شاه خلد الله ملكه و سلطانه* ۸۳۳

and in a small square, inserted into the middle the second line *وارنه*—whatever these words may mean.

REVERSE.—Within a square, the *Kalimah*. The square is inscribed in a lozenge, and the four spaces between the sides of the square and sides of the lozenge contain the names of the four Khalífahs. In the first line of the obverse, the coin has a punch mark. *Vide* Thomas, 'Chronicles,' p. 333.

A letter was read from the Rev. Mr. Erhardt, Superintendent of the Secundra Orphanage, in reply to a letter of the Secretary, written in compliance with the resolution passed at the general meeting in June, asking for further information as to the fact of the finding of certain children in the company of wolves. Mr. Erhardt gave no new facts, but stated his very strong belief of one of the children referred to having been burnt out of a wolves' den, such belief being founded on the extremely animal-like and filthy propensities of the child when brought to the asylum, the recent burns on his person and the testimony of the persons who brought him.

The following gentlemen duly proposed and seconded, were balloted for and elected ordinary members.

J. C. Parker, Esq.

W. J. Olpherts, Esq.

Lieut. C. T. Bingham.

Kumára Grischandra Sinha Bahádúr.

Bábu Jogeshchandra Dutt.

Alexander Pedler, Esq.

Col. W. E. Marshall.

W. G. Bligh, Esq.

Capt. W. F. Badgley.

Lieut. R. G. Woodthorpe, R. E.

D. D. Cunningham, Esq., M. B.

Capt. J. Butler, (re-elected).

Mr. E. Van Cutsem has intimated his desire to withdraw from the Society.

Mr. H. Blochmann exhibited rubbings of the following inscriptions received from General A. Cunningham, C. S. I., in continuation of the rubbings shewn at the last meeting.

Ráprí.

The 'Aláuddín Khiljī Inscription of the 'Idgáh at Ráprí.

بناء ابن بقاء شريف بتوفيق يزداني و تأييد سبحاني و بفضل رباني در عهد
خلافة سكندر الثاني علاء الدنيا و الدين المخصوص بعناية رب العالمين ابو المظفر
محمد شاه السلطان ناصر امير المؤمنين و نوبت ايالت بنده كمترين خدايگاني كافور
سلطاني ثقيل الله منهم و احسن الله جزاءهم في المنتصف من شهر المبارك
رمضان عظم الله حرمة سنة احدي عشر و سبعمائة ॥

The building of this noble work [took place] by the grace of God and the assistance of the Almighty and the favour of the Lord, during the time of the reign of the second Alexander, 'Aláuddunyáwaddín, who is distinguished by the kindness of the Lord of the worlds, Abul Muza'far Muḥammad Sháh, the king, the helper of the Commander of the Faithful, and during the governorship of the mean slave of his Majesty, Káfúr, the Royal—may God accept it from them, and may God give them an excellent reward! In the middle of the blessed month of Ramazán (may God increase its honor!) of the year 711. [End of February, 1312, A. D.]

The tablet measures 5 feet by 2 feet, and consists of four lines. The letters are thick and clumsy.

The inscription refers to the end of 711, when Malik Káfúr came back to Dihlí laden with the treasures of Malabar and Dhúr Samundar.

Ráprí is often mentioned in early Muhammadan history. It lies S. E. of Agrah, on the left bank of the Jamuná, opposite to Batesar. It is now in ruins, the chief town of the Parganah being Shikohábád (named after Dará Shikoh).

Mahobá.

Mahobá lies near the southern boundary of the N. W. Provinces, halfway between Kánhpúr and Ságár.

During the Muhammadan rule it belonged to Sirkár Kálinjar, and was famous for its excellent betel leaves, of which it had annually to furnish 120,000. During the reign of Fírúz Sháh (III) it was for a long time the jágir of Naçír Khán, and after him that of his son Sulaimán (A. H. 781, or A. D. 1379). *Badáoní*, I, 251.

The Ghiyásuddín Tughluq Inscription on the Mosque of Mahobá.

بفضل ايزدي آمد بشارت
كه مسجد در مهوبا شد مبارك
بعهد پادشاهي هفت اقليم
مدار المملكت ملجاي اسلام
غياث الدين و دنيا دومين جم
فلك درگاه تغلق شاه عالم

جهاندارے که زخم گرز و خنجر شدش ضبط ممالک چون مکنده
 فلک سان در زمانه مهربان باد بگیتی تخت ملکش جاودان باد
 کدینه بند شاهى نکرنام که شد در نوبتش مسجد باتمام
 ملک تاج الدول با بخت سرمه محمد خلق نیکو اسم احمد
 بسلک عون یزدان درکشیده
 چو برقصه نزون شد بست و دو راست در و دیوار مکن مسجد آراست
 ز هجرت در ربیع آخرین بود که دست نیک در بنیاد این بود

1. By the favour of God the good news arrived that the Mosque had been built at Mahobá,

2. During the reign of the king of the seven zones, the centre of royalty, the asylum of Islám,

3. Ghíyás uddunyá waddín, a second Jam, whose throne is (as high as) the heaven, Tughluq, the king of the world,

4. A king who, like Alexander, by the force of his club and sword, conquered countries,

5. May he, like the heaven, be kind in his reign, and may the throne of his kingdom be everlasting in the world!

6. A mean slave of the famous king, in whose reign the mosque was completed,

7. Malik Tájuddaulah, the fortunate, mild as Muhammad, whose excellent name is Ahmad.

8. Has with the help of God * * * (illegible)

9. When twenty-two years had passed beyond 700, he built the door, the wall, and the courtyard of the mosque.

10. It was in Rabi' II. of the Hijrat, that his kind hand was engaged in building this edifice.

Thus the mosque was built by Malik Tájuddín Ahmad, in Rabi' II, 722, A. H., or May, 1322, A. D.

An imperfect reading of this inscription, together with two modern inscriptions from the Hamírpúr District, were some time ago received by the Society from Mr. E. T. Atkinson, C. S. The first of the modern ones refers to the building of a Mosque and the digging of a well by one Khwájah Fírúz during the reign of Aurangzib, but the reading is not metrical. The second inscription is (metre, *khafif*)—

در زمان خدبو عالمگیر کنده شد چه چو چشمه حیوان
 قلعه ب آب بود زن سالش عقل گفت آب داد حاتم خان

1. In the reign of 'A'lamgír, the king, this well, which is like the water of life, was dug.

2. The Fort was without water. Genius, therefore, said that the date was given in the words 'Áb dáá Hátim Khán,' 'Hátim Khán procured water.'

This gives A. H. 1113, or A. D. 1701.

Dihli'.

1. *The Firúz Sháh Inscription of 753 A. H.*

قال رسول الله صلى الله عليه وسلم إذا رايتم الرجل يتعاهد المسجد فاشهدوا
اليه بالإيمان فإن الله يقول إنما يعمر مساجد الله من آمن بالله واليوم الآخر * بناء
ابن مسجد در عهد دولت سلطان اعظم قهرمان معظم الوائق بتائيد الرحمن ابو
المظفر فيروز شاه السلطان خلد الله ملكه و سلطانه باني اين خير بندۀ اميدوار
نرحمت پروردگار بهادر مولی امير المومنين المدعو بنثار خان تقبل الله منه
في الغرة من رمضان سنة ثلث وخمسين وسبعماية ||

The Prophet of God—may God's blessings rest on him!—says, "If you see that the man pledges himself to the mosque, testify in his favour; for God says, 'Surely he who believes in God and the last day, will build the mosques of God.' [Qorán.]

The building of this mosque [took place] in the time of the reign of the great Sultán, the exalted sovereign, who trusts in the help of the Almighty, Abul Muzaffar Firúz Sháh, the king,—may God perpetuate his kingdom and rule! The builder of this religious edifice is the slave who hopes in God's mercy, Bahádur Maulá, the freed slave (*maulá*) of the Commander of the Faithful, who is called Nisár Khán—may God accept it of him! On the first day of Ramazán, 753. [11th October, 1352.]

The inscription measures about $4\frac{1}{2}$ feet by 2 feet, and consists of four lines without the usual bars between the lines. The letters are clumsy, and there are no diacritical points. Hence my reading of the name of the builder 'Nisár Khán' is somewhat doubtful.

The inscription is of interest as it belongs to the very beginning of Firúz Sháh's reign.

2. *The Sikandar Sháh Inscription of 900 A. H.*

بسم الله الرحمن الرحيم
قال الله تبارك وتعالى و ان المساجد لله فلا تدعوا مع الله احدا عمارت ابن
بقعة شريف در عهد سلطان السلاطين بادشاه ربع مسكون برگزيده حضرت كن فيكون
الواثق بالتائيد الرحمن ابو المظفر سكندر شاه بن بهلول شاه سلطان كاله خلد الله
ملكه و سلطانه و اعلى امره و شانه در عمارت مسجد جامع بوع (؟) بنا كرد مغفور
مرحوم ابو امجد *** و تاريخ غري ماه ربيع الاول سنة تسعماية ||

God who is blessed and exalted has said, "Surely the mosques belong to God, do not call on any one else besides God" [Qorán]. The building of this excellent work of piety [took place] during the reign of the king of kings, the ruler of the inhabited quarter of the world, the chosen of the Lord who said 'Let there be,' and it was, who trusts in the assistance of the All-merciful, Abul Muzaffar Sikandar Sháh, son of Buhlúl Sháh, Sultán Kálah—may God perpetuate his kingdom and rule and elevate his condition and dignity! This door of the building of the Jami' Masjid [one word without meaning] was erected by the pardoned, deceased Abú Amjad *** [illegible]. Dated 1st Rabi' I, 900. [30th November, 1494].

This inscription contains nine lines, separated by the usual bars, and looks more like a headstone than a mosque inscription.

3. *Inscription from the tomb of one Daulat Khán (A. H. 920.).*

در عهد همايون سلطان الاعظم المعظم المتوكل على الرحمن سكندر شاه بن
پهلول شاه سلطان خلد الله ملكه و سلطانه بنا كرد اين گنبد بندا اميدوار برحمت
پروردگار دولت خان *** خواجه محمد غرغز ماه رجب سنه عشرين و تسعمائة ۱۱

In the auspicious reign of the great exalted Sultán, who trusts in the All-merciful, Sikandar Sháh, son of Buhlúl Sháh, the king,—may God perpetuate his kingdom and rule!—this vault was built by the slave who hopes in the mercy of the Creator, Daulat Khán *** Khwájah Muhammad, 1st Rajab, 920. [23rd August, 1514.].

Mr. T. W. Beale, of Partábpúrah, Ágrah, the learned author of the *Miftáh uttawárikh*, has sent the following readings of inscriptions.

1. *Bia'nah.*

"There is a place of worship of the Hindús, about $1\frac{1}{2}$ kos from the Qaçbah of Biánah, in the district of Bhartpúr, called "Barmádh Mátá." In the 7th year of Jahángir (1022 A. H.), Maryam Zamání (مریم زمانی), the daughter of Rájá Bihári or Bhára Mal and mother of Jahángir, caused a garden and a Báolí (a well with steps) to be built there, which cost her 20,000 Rs. At present, there is no sign of the garden, but the building which is over the Báolí still exists. It is built with red stone and has the following inscription on a slab of marble."

جهان شد گلشن از مه تا جمعی	بعهد شاه نورالدین جهانگیر
کزو تابنده شد نور الهی	بحکم مادرش مریم زمانی
ز شرمش خلد را شد چهره کاهی	مرتب گشت باغ و باولی خوش
سنه هفت جلوس پادشاهی	خرد گفت از بی تاریخ تعمیر

۱۰۲۲

1. In the reign of the king Núruddín Jahángir, the world became a rose-bed, from the moon to the fish.

2. By order of his mother Maryam Zamání, from whom the divine light shone forth,

3. This garden and this well were nicely built, so much so, that from shame the face of Paradise got pale.

4. Genius expressed the date of the building in the words, 'The 7th year of the Imperial accession.' [A. H. 1022, or A. D. 1613.]

The phrase 'from the moon to the fish' is often used by poets, and is an allusion the old belief that the earth rests upon a fish; hence 'from the moon to the fish' means 'the whole earth.'

2. *Ajmír.*

"Jahángir writes in the Tuzuk i Jahángirí, that there is a large tank in Ajmír, and that when he visited the place in 1024 A. H., he named it

"Chashmah i Núr" ('Fountain of light') after his own name Núruddín, and ordered a building to be erected on its banks, which is still standing. The following inscription is to be seen at the top of the building, which shows the year of its erection, 1024 A. H."

بلند اقبال شاه هفت کشور • که وصف او نمیگنجد به تقریر
 فروغ خاندان شاه اکبر • شهنشاه زمان شاه جهانگیر
 درین سرچشمه چون آمد ز فیض • روان شد آب و خاکش گشت انیسر
 شهنشه کرد نامش چشمه نور • شده آب خضرزان چاشنی گیر
 دهم سال از جلوس شاه غازی • بحکم پادشاه نیک ندبیر
 بطرف چشمه نور این عمارت • جهان آرای شد از روی نقدیر
 خرد تاریخ انعامش رقم کرد • محل شاه نورالدین جهانگیر

۱۰۲۴

1. When the fortunate king of the seven realms, whose praise cannot be expressed in writing,—

2. The light of the house of Sháh Akbar, the sovereign of the time, Sháh Jahángír,—

3. Came to this spring, the water flowed in consequence of his liberality, and its soil became the elixir of life.

4. The king named it 'Fountain of Light,' and Khizr's water [the water of life] derives its taste from it.

5. In the 10th year of the accession of the victorious king, by order of the well-meaning ruler,

6. This building at the side of the 'Fountain of Light' became, by the decree of fate, an ornament of the world.

7. Genius expressed the date of its completion in the words, 'the Mahall of Sháh Núruddín Jahángír.' A. H. 1024 [A. D. 1615].

3. A'grah.

The following is the Táríkh of the famous Ismá'il Beg, who was imprisoned by the Maráthas in the Fort of A'grah in the time of the blind emperor Sháh 'Álam, and died there in the year 1214, A. H. His tomb is still to be seen at A'grah, bearing the following inscription—

احتشام الدوله اسمعیل خان • چونکه رحلت کرد در دارالجنان
 گفت هائف سال تاریخش زغیب • آه صاحب شوکتی شد از جهان

۱۲۱۴

1. When Ihtishám uddaulah Ismá'il Khán left for Paradise,

2. A voice from heaven expressed the date of his death in the words 'Alas, a great man has gone from this world.' A. H. 1214 [A. D. 1799-1800].

Regarding Ismá'il Beg, *vide* Keene's History of the Mogul Empire, Book II, Chapter V.

The following papers were read—

1. *Authorities for the History of the Portuguese in India.*—By

T. W. H. TOLBORT, B. C. S., *Miydnwālī, Bannū.*

(Abstract.)

Mr. Tolbort gives in this paper a list of the authors whose works are most valuable for the History of the Portuguese in India. He limits the range of these authorities to the period between 1493 when Vasco da Gama discovered India, and 1663 when the capture of Cochin by the Dutch finally broke the power of the Portuguese, and established the supremacy of others in the East. During that period the adventures of the Portuguese form a chapter of Universal History. In years subsequent to 1663, the subject, though not devoid of incidents of gallantry and romance, dwindles to one of national rather than universal interest.

The oldest work is by Correa, who came in 1512 as amanuensis to Albuquerque to India. Then follow João de Barros (died 1570), whose 'Da Asia' is looked upon as a classical work, and Couto, the continuator of De Barros, after whom the works of many other authors are described.

The author also gives references to Muhammadan writers, and notices in conclusion the Dutch and Portuguese records that still exist at Goa and other settlements, selections from which were printed between 1866 and 1869 by Sr. Rivara of Goa.

2. *Notes on two Copper-plate Grants of Govindachandra of Kanouj.*—By

BA'BU RA'JENDRALA'LA MITRA.

The two copper plates, which form the subject of the paper, were lately discovered in the village of Basāhi in the Etawah district, and sent for notice by Mr. E. T. Atkinson, B. C. S. One of them bears date Samvat 1161 = A. D. 1103, and the other 1174. Both record grants of villages to Brahmans by Rajā Govindachandra Deva of Kanouj. The paper gives a summary of the dates of the last line of Kanouj kings from Yasovigraha to Jayachandra, the last sovereign, from whom the country passed into the hands of Moslim rulers; and notices a number of taxes and cesses which zemindars were authorized to impose on the people, including among others, a chowkidary tax, a tax on justice, a percentage on mortgages, and cesses on mines, salt-pits, mowa and mango trees, khaskhas grass, and trade in precious metals. Annexed to the paper are transcripts and translations of the two records.

3. *On a new genus and species (Hylæocarcinus Humei) of Land Crabs from the Nicobar Islands.*—By J. WOOD-MASON.

The species described in this paper is very closely allied to the members of the West Indian and Brazilian genera, *Gecarcinus* and *Pelocarcinus*, but

differs from both in that the infra-orbital lobe is not united to the front. The external maxillipeds are similar in form to those of the latter but in the mode of insertion of the three terminal joints of these appendages *Hylæocarcinus* differs from both genera, forming a transition from the one to the other: in *Gecarcinus* the third joint completely hides the terminal ones which are inserted on its inner face; in *Hylæocarcinus* it hides all but the external edge of the first of these joints: and in *Pelocarcinus* these joints are inserted at the middle of its anterior margin and are completely uncovered. In *Hylæocarcinus*, as in its New World allies, the dactylopodites of the ambulatory legs are armed with six rows of spines.

A male and a female were taken by the author on Treis Island, Nicobars, and another male by Mr. A. O. Hume, C. B., on Narcondam Island, Andamans.

The paper will appear in the next number of the Journal.

4. *Descriptions of new species of Unionidæ.*—By W. THEOBALD.

This paper will appear in Part II, No. 4, of the Journal.

Dr. Waldie made the following brief remarks on some investigations he was engaged in, regarding the filtration of the water of the river Hughli during the rainy season—

The filtering operations at Palta for the water supply of Calcutta have, during the rainy season, been attended with great trouble and difficulty, and remedies had been proposed for this based upon experience in water filtration in England. He, the speaker, however, who had long been acquainted with the difficulty, had always maintained that it arose from a peculiarity in the water itself, and that conclusions drawn from experience with English river water were not applicable to the case. Hitherto he had not been able to support his view otherwise than by arguments drawn from the difference of circumstances in the two cases and by the actual facts observed in the filtration. A few days ago a new idea occurred to him by which he thought it probable that the nature of the peculiarity of the water might be explained, which he had immediately put to the test of experiment, and with such a satisfactory result that he intended to follow it up, and would, with permission, bring it before the Society at the first opportunity. The title of the proposed communication would probably be, "An experimental enquiry into the characteristics of the muddy water of the Hughli during the rainy season, with reference to its purification."

The President announced that there would be a recess of two months and that the next meeting would be held in the month of November.

LIBRARY.

The following additions have been made to the Library since the meeting held in July last.

Presentations.

*** Names of Donors in Capitals.

Royal Society, Proceedings, Nos. 139-143.

No. 139. *A. Rattray*—Further experiments on the more important Physiological Changes induced in the Human Economy by Change of Climate. *A. Ransome*—On the mechanical conditions of the Respiratory Movements in Man. ●

No. 140. *E. Ray Lankester*—A contribution to the knowledge of Hæmoglobin. *J. Norman Lockyer*—Researches in Spectrum-Analysis in connexion with the spectrum of the Sun.

No. 141. *J. N. Lockyer* and *G. M. Seabrooke*—On a new method of viewing the Chromosphere. *R. J. Lee*—Further remarks on the Sense of Sight in Birds. *W. Huggins*—Note on the Wide-slit Method of viewing the Solar Prominences. *Professor Owen*—On the Fossil Mammals of Australia, family *Macropodidæ*. *H. C. Bastian*—Note on the origin of Bacteria and on their relation to the process of Putrefaction.

No. 142. *Dr W. Kowalevsky*—On the Osteology of the *Hypnotamidæ*. *F. Guthrie*—On a new relation between Heat and Electricity. *H. N. Moseley*—On the Anatomy and Histology of the Land-Planarians of Ceylon, with some account of their habits, and a description of two new species, and with notes on the Anatomy of some European Aquatic species. *H. Avey*—On Leaf-arrangement

No. 143. *Rudolph von Willenböck-suhn*—On a new Genus of Amphipod Crustaceans. *J. D. Macdonald*—On the Distribution of the Invertebrata in relation to the theory of Evolution. *H. C. Bastian*—On the temperature at which Bacteria, Vibriones, and their supposed Germs are killed when immersed in fluids or exposed to heat in a moist state. *The Earl of Rosse*—The Bakerian Lecture: On the Radiation of Heat from the Moon, the Law of its Absorption by our atmosphere and its variation in amount with her Phases. *E. A. Schaffer*—On the structure of striped Muscular Fibre. *Sir B. C. Brodie*—Note on the synthesis of Marsh-Gas and Formic Acid and on the Electric Decomposition of Carbonic Oxide. *J. H. Gladstone* and *A. Tribe*—On an Air-Battery.

Philosophical Transactions, Vol. 161, part II, and Vol. 162, part I.

Vol. 161, Part II. *General Sir E. Sabine*—Records of the Magnetic Phenomena at the Kew Observatory, Analysis of the Principal Disturbances shown by the Horizontal and Vertical Force Magnetometers of the Kew Observatory from 1859 to 1864. *Archdeacon Pratt*—On the constitution of the Solid Crust of the Earth. *N. Story-Maskelyne*—On the Mineral Constituents of Meteorites. *H. E. Roscoe*—On the Measurement of the Chemical Intensity of Total Daylight made at Catania during the Total Eclipse of December 22nd, 1870. *W. C. Williamson*—On the Organization of Fossil Plants of the Coal-measures: Calamites. *A. Güntler*—Description of *Ceratodus*, a genus of Ganoid Fishes, recently discovered in the rivers of Queensland, Australia.

Vol. 162, Part I—*E. G. Stone*—An experimental determination of the Velocity of Sound. *P. M. Duncan*—On the structure and affinities of *Gynia annulata*, Dana, with remarks upon the persistence of Palæozoic Types of *Madreporaria*. *A. Macalister*—The Myology of the *Cheiroptera*. *W. C. Williamson*—On the organization of the Fossil Plants of the Coal-measures: Lycopodiaceæ, Lepidodendra, and Sigillaria.

Catalogue of Scientific Papers compiled and published by the Royal Society of London, Vol. VI. (1800-1863).

THE ROYAL SOCIETY OF LONDON.

Zoological Society of London, Proceedings, 1872, March-June.

J. Anderson—On some Persian, Himalayan and other Reptiles. *E. W. H. Holdsworth*—Catalogue of Birds found in Ceylon, with some remarks on their habits and local distribution and description of two new species peculiar to the Island. *W. E. Brooks*—On the Imperial Eagles of India. *Dr. J. E. Gray*—On the Genus *Chelymys* and its allies from Australia. *Major H. H. Godwin-Austen*—Description of new Land and Fresh-water shells from the Khasi, N. Cachar and Naga Hills. *Sir V. Brooke*—On *Hydropotes inermis* and its Cranial characters as compared with those of *Moschus moschiferus*. *A. H. Garrod*—On the Mechanism of the Gizzard in Birds. *J. Anderson*—On a supposed new Monkey from the Sunderbans to the East of Calcutta. *R. Swinhoe*—Descriptions of two new Pheasants and a new *Garrulax* from Ningpo, China. *P. Moore*—Descriptions of new Indian Lepidoptera. *E. W. H. Holdsworth*—Note on a Cetacean observed on the west Coast of Ceylon. *A. Günther*—On the Reptiles and Amphibians of Borneo. *Viscount Walden*—Notice of an appendix to his memoir on the birds of Celebes. *A. Anderson*—Additional notes on the Raptorial Birds of North-Western India. *S. J. Bowerbank*—Contributions to a general history of the *Spongiadon*. *Capt T. Hutton*—On the Bats of the North-Western Himalayas. *Dr. J. Murie*—On the Indian Wild Dog. Observations on the Macaques, I. The Bornean Ape. On the Cranial Appendages and Wattles of the Horned Tragopan.

Index to the Proceedings, 1861-70.

Transactions, Vol. VIII, Part 3.

THE ZOOLOGICAL SOCIETY OF LONDON.

Geological Society of London, Journal, No. 113, February, 1873.

H. Woodward—On Eocene Crustacea from Portsmouth.

THE GEOLOGICAL SOCIETY OF LONDON.

Chemical Society of London, Journal, November 1872, to April 1873, with Supplementary Number containing Index and Title-page to Vol. X.

Novr. 1872. *Professor Cannizzaro*—Considerations on some points of Theoretic Teaching of Chemistry.

Sept 1873. *W. C. Roberts*—On the condition of the Hydrogen occluded by Palladium, as indicated by the Specific Heat of the Charged Metal. *W. H. Hartley*—On the Standardising of Acids. *E. Nicholson*—Analysis of the water of the Mahanuddy.

THE CHEMICAL SOCIETY OF LONDON.

The Statistical Society, Journal, 1872, Parts III—IV.

H. Jewell—Some statistics relating to the Traffic through the Suez Canal.

THE STATISTICAL SOCIETY OF LONDON.

Royal Geographical Society, Proceedings, Vol. XVI, No. 5, Vol. XVII, No. 1.

Vol. XVI, No. 5. *Shaw*—Central Asia in 1872. *Strachey*—The Scope of Scientific Geography.

Vol. XVI. No. 1. *Godwin-Austen*—The Garo Hills. *Macdonald, Tanner, Badgley*—The Lushai Expedition.

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

The Royal Asiatic Society, Journal, Vol. VI, Part II.

James Fergusson—On Hiouen-Tsang's Journey from Patna to Ballabhi, and note on the same. *Col. H. Yule*—Northern Buddhism.—Hwen T'sang's account of the Principalities of Tokharistan. *Dr. H. Kern*—The Brhat Sanhitā. *E. Thomas*—The Initial Coinage of Bengal. *S. Beal*—The Legend of Dipankara Buddha.

THE ROYAL ASIATIC SOCIETY OF GREAT BRITAIN AND IRELAND.

Royal Institution, Proceedings, Vol. VI, Parts V-VI.

No. 56. *Professor Tyndall*—On the Identity of Light and Latent Heat. *Dr. Gladstone*—On the Crystallization of Silver, Gold and other Metals. *C. W. Siemens*—On measuring Temperatures by Electricity. *S. Evans*—On the Alphabet and its origin.

No. 57. *J. N. Lockyer*—On the Eclipse Expedition of 1871.—*A. V. Harcourt*—On the Sulphurous impurity in Coal Gas. *N. Story-Maskelyne*—On Meteoric Stones. *Prof. Abel*—On the more important Substitutes for Gunpowder. *Prof. Odling*—On the History of Ozone.

THE ROYAL INSTITUTION OF LONDON.

Institution of Civil Engineers, Minutes of Proceedings, Vols. 3, 4, 6-17, 19-34.

Catalogue of the Library, 2 Vols.

Transactions, Vols. 1, 2, 3.

THE INSTITUTION OF CIVIL ENGINEERS, LONDON.

Birmingham Institution of Mechanical Engineers, Proceedings, January, 1873.

W. Ruines—Description of an improved apparatus for working and interlocking Railway Signals and Points.

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Abhandlung zur zerstreung der vorurtheile über das alte und neue Morgenland, von H. Ewald.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1873.*

• Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height th. Baromet. at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermomete	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°		
1	29.561	29.605	29.488	0.117	85.2	91.7	82.0	9.7
2	.556	.606	.517	.089	83.7	87.5	81.0	6.5
3	.563	.608	.507	.101	83.0	87.0	80.5	6.5
4	.509	.518	.437	.111	85.1	87.4	80.0	7.4
5	.493	.534	.425	.109	81.5	85.8	79.2	6.6
6	.474	.515	.414	.101	83.0	87.0	79.4	7.6
7	.481	.568	.430	.138	83.8	91.4	80.5	10.9
8	.522	.565	.456	.109	83.8	87.5	81.0	6.5
9	.478	.525	.428	.097	83.5	88.1	81.4	7.0
10	.459	.503	.394	.109	84.8	92.0	80.2	11.8
11	.459	.506	.406	.100	83.3	90.0	80.5	9.5
12	.426	.479	.357	.122	82.4	87.0	80.0	7.0
13	.387	.429	.317	.112	82.8	88.6	80.5	8.1
14	.427	.507	.371	.136	81.3	83.0	79.6	3.4
15	.491	.528	.431	.097	82.6	89.0	79.5	9.5
16	.473	.515	.403	.112	84.0	88.5	81.0	7.5
17	.429	.494	.364	.130	84.5	91.0	81.0	10.0
18	.299	.404	.194	.210	80.5	82.2	79.5	2.7
19	.379	.463	.314	.149	83.6	89.3	79.5	9.8
20	.461	.521	.417	.104	85.5	90.2	82.0	8.2
21	.512	.552	.477	.075	84.2	91.0	81.8	9.2
22	.498	.559	.412	.147	85.6	92.0	81.0	11.0
23	.453	.503	.386	.117	83.4	87.6	81.0	6.6
24	.466	.528	.410	.118	83.6	88.8	80.6	8.2
25	.516	.565	.456	.109	83.9	88.5	80.3	8.2
26	.513	.571	.441	.130	85.1	90.3	81.8	8.5
27	.468	.515	.426	.089	82.4	84.5	80.5	4.0
	.511	.577	.462	.115	81.1	86.0	77.5	8.5
	.559	.615	.5	.106	81.8	87.0	77.5	9.5
30	.585	.616	.525	.091	81.4	89.3	80.2	9.1
31	.559	.597	.499	.098	83.0	85.8	80.5	5.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

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taken at the Surveyor General's Office, Calcutta,
in the month of July 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.5	3.7	78.9	6.3	0.967	10.34	2.27	0.82
2	80.6	3.1	78.4	5.3	.952	.21	1.86	.85
3	80.5	2.5	78.7	4.3	.961	.33	.49	.87
4	80.6	2.5	78.8	4.3	.964	.36	.50	.87
5	80.1	1.4	79.1	2.4	.973	.49	0.82	.93
6	80.3	2.7	78.4	4.6	.952	.21	1.61	.86
7	81.1	2.7	79.2	4.6	.976	.45	.65	.86
8	81.6	2.2	80.1	3.7	1.005	.75	.35	.89
9	81.3	2.2	79.8	3.7	0.995	.66	.34	.89
10	81.2	3.6	78.7	6.1	.961	.29	2.17	.83
11	81.2	2.1	79.7	3.6	.992	.63	1.30	.89
12	80.5	1.9	79.2	3.2	.976	.50	.11	.90
13	81.2	1.6	80.1	2.7	1.005	.77	0.98	.92
14	79.9	1.4	78.9	2.4	0.967	.43	.81	.93
15	80.8	1.8	79.5	3.1	.986	.60	1.08	.91
16	81.8	2.2	80.3	3.7	1.011	.82	.35	.89
17	82.1	2.4	80.4	4.1	.014	.85	.50	.88
18	79.6	0.9	79.0	1.5	0.970	.46	0.52	.95
19	80.8	2.8	78.8	4.8	.964	.34	1.69	.86
20	82.2	3.3	79.9	5.6	.998	.65	2.07	.84
21	82.1	2.1	80.6	3.6	1.021	.92	1.32	.89
22	82.0	3.6	79.5	6.1	0.986	.53	2.23	.83
23	81.2	2.2	79.7	3.7	.992	.63	1.33	.89
24	81.2	2.4	79.5	4.1	.986	.57	.46	.88
25	81.3	2.6	79.5	4.4	.986	.57	.56	.87
26	81.7	3.4	79.3	5.8	.979	.46	2.11	.83
27	80.8	1.6	79.7	2.7	.992	.66	0.95	.92
28	79.5	1.6	78.4	2.7	.952	.25	.92	.92
29	79.2	2.6	77.4	4.4	.922	9.98	1.47	.87
30	80.7	3.7	78.1	6.3	.943	10.10	2.21	.82
31	80.2	2.8	78.2	4.8	.946	.15	1.67	.86

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1878.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Ho.	Height Baromet. Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night	29.509	29.600	29.335	0.274	81.7	83.9	77.6	6.3
1	.195	.603	.325	.278	81.5	83.5	77.5	6.0
2	.183	.598	.321	.277	81.3	83.2	77.5	5.7
3	.171	.590	.314	.276	81.1	82.8	77.8	5.0
4	.164	.583	.323	.260	80.9	82.6	77.9	4.7
5	.175	.600	.339	.261	80.7	82.5	78.0	4.5
6	.186	.602	.341	.261	80.8	82.8	78.5	4.3
7	.198	.614	.323	.291	81.4	84.0	79.5	4.5
8	.511	.612	.332	.280	82.6	81.8	80.5	4.3
9	.516	.615	.312	.303	81.0	87.0	80.0	7.0
10	.518	.616	.311	.305	85.0	88.0	81.0	7.0
11	.509	.616	.291	.325	85.8	90.0	80.7	9.3
Noon.	.494	.596	.260	.336	86.6	91.7	80.8	10.9
1	.475	.580	.231	.349	86.9	91.0	80.2	10.8
2	.458	.559	.204	.355	86.7	91.6	81.5	10.1
3	.413	.544	.197	.347	86.2	92.0	81.5	10.5
4	.430	.538	.194	.344	85.8	91.5	81.0	10.5
5	.431	.525	.211	.314	85.1	88.8	79.5	9.3
6	.442	.539	.224	.315	84.2	88.6	77.7	10.9
7	.462	.561	.261	.300	83.3	86.7	77.5	9.2
8	.483	.582	.293	.289	82.8	86.0	77.5	8.5
9	.504	.605	.326	.269	82.4	85.1	77.5	7.6
10	.517	.607	.344	.263	82.1	84.7	77.5	7.2
11	.517	.615	.339	.276	81.9	84.2	77.5	6.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	80.1	1.3	79.5	2.2	0.986	10.62	0.75	0.93
1	80.2	1.3	79.3	2.2	.979	.55	.76	.93
2	80.0	1.3	79.1	2.2	.973	.49	.75	.93
3	79.9	1.2	79.1	2.0	.973	.49	.75	.93
4	79.7	1.2	78.9	2.0	.967	.43	.67	.91
5	79.6	1.1	78.8	1.9	.964	.40	.64	.91
6	79.7	1.1	78.9	1.9	.967	.43	.64	.91
7	80.2	1.2	79.1	2.0	.983	.58	.69	.94
8	80.8	1.8	79.5	3.1	.986	.60	1.08	.91
9	81.3	2.7	79.4	4.6	.983	.51	.66	.86
10	81.7	3.3	79.4	5.6	.983	.49	2.04	.84
11	81.8	4.0	79.0	6.8	.970	.35	.48	.81
Noon.	82.2	4.4	79.6	7.0	.989	.51	.60	.80
1	82.4	4.5	79.7	7.2	.992	.57	.68	.80
2	82.4	4.3	79.8	6.9	.995	.60	.58	.80
3	82.0	4.2	79.1	7.1	.973	.38	.61	.80
4	82.0	3.8	79.3	6.5	.979	.41	.39	.81
5	81.6	3.5	79.1	6.0	.973	.40	.17	.83
6	81.0	3.2	78.8	5.4	.964	.31	1.00	.85
7	80.9	2.1	79.2	4.1	.976	.48	.45	.88
8	80.7	2.1	79.2	3.6	.976	.48	.27	.89
9	80.6	1.8	79.3	3.1	.979	.53	.08	.91
10	80.6	1.5	79.5	2.6	.986	.60	0.91	.92
11	80.5	1.4	79.5	2.4	.986	.62	.82	.93

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1873.*

Solar Radiation, Weather, &c.

Max. radiat. o	Rain G. inches ft. a	Prevailing direction.	P ₁ lb	Daily velocity Miles	General aspect of the Sky.
137.5	0.09	E S E & S by E	0.2	123.0	O to 5 A. M. S to 8 A. M. \curvearrowright i to 6 P. M., \searrow i & \searrow i to 11 P. M. Light R between 5 & 6, at 12 $\frac{1}{2}$ A. M., & 6 $\frac{1}{2}$ P. M.
132.5	0.13	S E & S S E	0.7	163.9	S to 6 A. M., \curvearrowright i to 6 P. M., \searrow i to 11 P. M. T at 6 $\frac{1}{2}$ A. M. Slight R at 6, 9 $\frac{1}{2}$, 10 $\frac{1}{2}$ A. M. & 1 P. M.
134.0	0.51	S E & S by E	1.0	117.5	B to 6 A. M., \curvearrowright i to 5 P. M., \searrow i to 9 P. M. S to 11 P. M. T between 12 A. M., & 1 P. M. Slight R between 9 & 10 at 12 $\frac{1}{2}$ A. M. 1 $\frac{1}{2}$ between 3 & 4 & at 10 $\frac{1}{2}$ P. M.
4 130.0	0.16	S E & S	0.5	91.0	\searrow i & \searrow i to 6 A. M., \curvearrowright i to 9 P. M. O to 11 P. M. T at 4 $\frac{1}{2}$ P. M. Slight R at 10 $\frac{1}{2}$ A. M., 2 $\frac{1}{2}$, 9 $\frac{1}{2}$, 10 $\frac{1}{2}$ & 11 $\frac{1}{2}$ P. M.
	0.42	S & S E	1.2	126.2	O to 11 A. M., \curvearrowright i to 6 P. M., \searrow i to 11 P. M. Slight R between 1 & 2, at 6 $\frac{1}{2}$, 9 $\frac{1}{2}$, 10 $\frac{1}{2}$ A. M., between 1 & 2 & at 3 $\frac{1}{2}$ P. M.
6 131.0	0.04	S		115.8	B to 2 A. M. O to 8 A. M., \curvearrowright i to 5 P. M., \searrow i to 11 P. M. Light R at 5, 7 A. M., & 1 P. M.
7 144.5	0.35	S S E & S	2.8	36.0	\searrow i & \searrow i to 2 A. M. O to 8 A. M. \curvearrowright i to 4 P. M., \searrow i to 9 P. M. S to 11 P. M. Slight R at 5 $\frac{1}{2}$, 6, 7 A. M., 2 $\frac{1}{2}$ & 4 $\frac{1}{2}$ P. M.
8 132.0	0.42	E S E & S E		158.1	\searrow i to 3 A. M. O to 6 A. M., \curvearrowright i to 4 P. M. S to 11 P. M. R at 8 $\frac{1}{2}$ from 12 $\frac{1}{2}$ A. M. 2, at 4 $\frac{1}{2}$ & 5 $\frac{1}{2}$ P. M.
9 147.0		S & S S E		66.9	O to 1 A. M., \searrow i & \searrow i to 4 A. M., \curvearrowright i to 12 A. M. O to 4 P. M. \searrow i to 11 P. M. T between 1 & 2 P. M. D at midnight 2 $\frac{1}{2}$ & 4 P. M.
10 139.0	0.41	S by E & S W	...	112.9	\searrow i to 2 A. M., \searrow i to 8 A. M., i to 3 P. M. O to 11 P. M. T between 5 & 6 and at 11 $\frac{1}{2}$ P. M. L at 11 P. M. Slight R from 5 to 11 $\frac{1}{2}$ P. M.

\searrow i Cirri,—i Strati. \curvearrowright i Cumuli, \searrow i Cirro-strati, \curvearrowright i Cumulo-strati, \searrow i Nimb, \searrow i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation	Rain Gauge $\frac{1}{8}$ ft. above Ground.	WIND.		Daily Velocity	General aspect of the Sky.
			Prevailing direction.	Pt		
		Inches			Mile.	
11	141.3	0.52	S W & S S W		106.8	O to 11 A. M., \nearrow to 2 P. M. O to 11 P. M. L at midnight. 3 A. M. & 11 $\frac{1}{2}$ P. M. Slight R after intervals.
12	134.5	1.10	S S W & Variable	0.8	88.8	S to 12 A. M. O to 5 P. M. S 11 P. M. L from midnight to 2 A. M., & at 1 $\frac{1}{4}$ P. M. T & R from 1 $\frac{1}{4}$ to 3 P. M.
13	137.8	0.10	S S W & S W		47.6	Chiefly O. Slight R at 1, 1 $\frac{1}{2}$, 2 $\frac{1}{2}$ & 5 P. M.
14	...	0.19	S W & W S W		13.9	Chiefly O. Slight R after intervals.
15	141.0	0.16	S W		148.0	Clouds of different kinds. T at 3 $\frac{1}{2}$ & 8 P. M. L at 8 P. M. Slight R after intervals from 10 $\frac{1}{2}$ A. M.
16	128.0	0.07	S W & S S W		31.4	B to 2 A. M., \nearrow to 5 A. M., \nearrow to 10 A. M., O to 2 P. M. \nearrow to 6 P. M. S to 11 P. M. Light R. on 10 $\frac{1}{4}$ A. M. 2 & between 6 & 7 P. M.
17	142.0	0.48	Variable	1.0	97.6	S to 5 A. M., \nearrow to 3 P. M. O to 11 P. M. T at 3 $\frac{1}{2}$ & 9 P. M. Slight R at 3, 11 $\frac{1}{4}$, 12 $\frac{1}{2}$ A. M., 3 $\frac{1}{2}$, 4 $\frac{1}{2}$ & 8 $\frac{1}{2}$ P. M.
18	...	1.80	N N E & Variable	...	184.0	Chiefly O. T at 2 P. M. R nearly the whole day.
19	140.0	0.31	S S W	1.0	230.0	O to 5 A. M., \nearrow to 10 A. M., \nearrow to 8 P. M. B to 11 P. M. L on an W at 8 P. M. R at midnight.
20	140.0	0.07	S S W		193.3	S to 4 A. M., \nearrow to 6 A. M., \nearrow to 7 P. M. B to 11 P. M. T at 2 $\frac{1}{2}$ P. M. Slight R at 3 $\frac{1}{2}$ P. M.
21	138.0	0.66	S S W & S by W		92.2	S to 9 A. M., \nearrow to 3 P. M. O to 6 P. M., \nearrow & \nearrow to 11 P. M. T from 1 to 4 P. M. R at 1 & 4 $\frac{1}{2}$ P. M.

\nearrow Cirri, \nearrow Strati, \nearrow Cumuli, \nearrow Cirro-strati, \nearrow Cumulo-strati, \nearrow Nimbi,
 \nearrow Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1873.*

Solar Radiation, Weather, &c.,

D.	Max. Sol radiation in Gauge 1 ft. above Ground.	WIND.			General aspect of the Sky.
		Prevailing direction.	Max Pressu	Daily Veloci	
	^o Inches				
22	137.0	SbyW, E&EbyN	...	60.6	S to 4 A. M., \i to 7 A. M., \i to 10 A. M., \i to 7 P. M., \i to 11 P. M. L on W at 8 P. M. D at 5½ P. M.
23	128.5	E by N & E	0.8	165.2	\i to 4 A. M. O to 12 A. M. Clouds of Different kinds to 11 P. M. T between 11 & 12 A. M. L at 9 & 10 P. M. Slight R after intervals.
24	138.8	E & S	1.4	219.4	S to 5 A. M. O to 9 A. M., \i to 6 P. M. B to 11 P. M. T at 12½ A. M. R between 11 & 12 A. M., at 3½, 5½ and 7½ P. M.
25	138.7	SSE, SSW & Sby ^[W]	0.4	203.8	Clouds of Different kinds. Light R at 2½, 3½, 10½ 11 & 12 A. M.
26	134.0	S S W & S W	0.8	157.5	S to 11 A. M., \i & \i to 3 P. M. O to 11 P. M. L from 7½ to 11 P. M. D at 2½, 3½ A. M. R at 11 P. M.
27	*2.05	S W	...	157.0	O to 8 P. M. S to 11 P. M. T from 1½ to 5 A. M. L at 2 A. M. R from midnight to 12 A. M.
28	3.26	S W	2.0	111.3	\i and \i to 4 A. M. O to 11 P. M. T at 5½ P. M. D at 5½ A. M. R from 1½ to 11 P. M.
29	130.0	W & S W	3.5	203.3	Chiefly O. Slight R from midnight to 6 A. M., at 2 & between 7 and 8 P. M.
30	136.5	S W & S S W	1.2	197.4	S to 3 A. M., \i to 1 P. M. O to 4 P. M. S to 11 P. M.
31	95.2	S W & S		107.0	O. L on S W at 8 & 9 P. M. D at 7, 8, 10½ A. M., 7½ & 11½ P. M.

\i Cirri — \i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi,
\i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

* Fell on the 26th and 27th.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.483
Max. height of the Barometer occurred at 10 and 11 A.M. on the 30th...	29.616
Min. height of the Barometer occurred at 4 P. M. on the 18th ...	29.194
<i>Extreme range</i> of the Barometer during the month	0.422
Mean of the daily Max. Pressures	29.536
Ditto ditto Min. ditto	29.422
<i>Mean daily range</i> of the Barometer during the month	0.114

	°
Mean Dry Bulb Thermometer for the month	83.4
Max. Temperature occurred at 3 P. M. on the 10th and 22nd ...	92.0
Min. Temperature occurred at 10 P.M. and 2 A.M. on the 28th and 29th..	77.5
<i>Extreme range</i> of the Temperature during the month	14.5
Mean of the daily Max. Temperature	88.2
Ditto ditto Min. ditto,	80.4
<i>Mean daily range</i> of the Temperature during the month	7.8

Mean Wet Bulb Thermometer for the month	80.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.5
Computed Mean Dew-point for the month	79.1
Mean Dry Bulb Thermometer above computed mean Dew-point ...	4.3

	Inches.
Mean Elastic force of Vapour for the month	0.973

	Troy grain.
Mean Weight of Vapour for the month	10.45
Additional Weight of Vapour required for complete saturation ...	1.61
Mean degree of humidity for the month, complete saturation being unity	0.87
Mean Max. Solar radiation Thermometer for the month ...	135.0

	Inches.
Rained 30 days.—Max. fall of rain during 24 hours'	3.26
Total amount of rain during the month	14.76
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	13.60
Prevailing direction of the Wind	S. W & S. S. W.

* Height 70 feet 10 inches above ground.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR NOVEMBER, 1873.

The Monthly General Meeting of the Society was held on Wednesday, the 5th instant, at 9 o'clock P. M.

Col. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From the Royal University of Norway, small collections of Minerals and Coleopterous insects, also a Medal issued by the University in commemoration of the Millenary Jubilee celebrated 18th July, 1872, in the Kingdom of Norway, which Kingdom was constituted by the king Harald Haarfager in the year A. D. 872.

The President remarked that no list or description of the minerals had been received, but they would be sent to the Superintendent of the Geological Survey for classification and afterwards deposited in the Museum.

2. From Bábu Yadavachandra Mukerji, a large palm-leaf MS. of the Rámáyana, Ayodhyakanda found floating in the river Húgli, at Kamarhati.

3. From Sirdar Attar Sing Bahádúr, a copy of Sakhee Book or description of Gooroo Gobind Singh's Religion and Doctrines.

From Eroud Tamoorus Deenshah Unclaschariah, Editor of "Shavuk Nameh," through Mr. B. Cowasjee, a copy of his Gujrati Poetry.

4. From Col. Guthrie, a cast of a Bengal coin of Fírúz Sháh the Second.

Mr. Blochmann said :—

This cast is taken from an apparently unique silver coin in the British Museum. The coin was struck by Saifuddin Abul Muzaffar Fírúz Sháh (II.) of Bengal, in 898 A. H. I have collected what little there is known of this king in my "Contributions to the History and Geography of Bengal."

5. From H. Beveridge, Esq., C. S., a copper-plate inscription found at Bakirganj.

The following letter accompanied the donation—

“The copper plate was found in May last by one Ram Kumar Bhis-mali while he was digging a tank at the village of Brahmandi in the north of this district and not far from the Madaripur bazaar. It was found at a depth of eight or ten cubits under the earth. It is supposed that the plate belonged to the Roy family, who first settled in Brahmandi. The place where it was found is near the house of Sám Sundra Rai, who is the only surviving descendant of the family. No one here can decipher the inscription. I am indebted for the possession of the plate and for the above particulars to one of my Deputy Collectors, Babu Hari Mohan Sein.

The following gentlemen are candidates for ballot at the next meeting.

J. Sykes Gamble, Esq., Assistant Conservator of Forests, Silligoree, proposed by S. Kurz, Esq., seconded by Dr. W. Schlich.

His Highness the Maharaja of Johore, K. C. S. I., K. C. C. I., proposed by Mr. J. Wood-Mason, seconded by the President.

M. L. Dames, Esq., C. S., Assistant Commissioner, Karnál, Panjáb, proposed by J. Delmerick, Esq., seconded by D. C. Ibbetson, Esq., C. S.

Bartle O'Brien, Esq., M. D., proposed by Mr. J. Wood-Mason, seconded by Dr. V. Richards.

J. Elliott, Esq., M. A., Professor of Mathematics in the Muir Central College, Allahabad, proposed by Mr. A. S. Harrison, seconded by Captain J. Waterhouse.

J. Blackburn, Esq., proposed by D. Waldie, Esq., seconded by Captain J. Waterhouse.

Kenneth McLeod, Esq., M. D., Secretary to the Surgeon General, Indian Medical Service, proposed by H. F. Blanford, Esq., seconded by C. Tawney, Esq.

The following gentlemen have intimated their desire to withdraw from the Society :—

The Hon'ble Sir R. Couch, Kt.

H. Woodrow, Esq.

Col. G. H. Saxton.

Col. B. Ford.

Sultán Muhammad Bashiruddin.

Mr. Wood-Mason exhibited a specimen of *Carcinus monas*, Pennant, taken in 1866 or 67 at Point de Galle Ceylon by Dr. J. Anderson. Comparison of this specimen with those from the Mediterranean lately received from Prof. Cornalia of Milan had enabled him to be sure of the correctness of his previous identification from the published figures and descriptions. The species appeared to have an exceedingly wide distribution, being to be found

in abundance on the shores of the British Isles, and of the United States whence it extended to the Arctic Sea, and on all the Mediterranean coasts : it had also been recorded by Heller from Rio Janeiro, and specimens would doubtless ultimately be met with in the Red Sea.

The President announced that the Council had appointed Mr. A. Pedler a member of the Physical Science and Library Committees.

The following papers were read—

1. *Notes on Aquila naevioides, A. fulvescens and A. vindhiana.*

By W. E. Brooks, C. E.

Having received from my friend, the Rev. Dr. Tristram, an African example of the true *Aquila naevioides*, Cuv., I am in a position to state that the Indian bird hitherto known under that name is quite a different species, viz.—*Aquila fulvescens*, Gray, as is clearly shewn in Gray and Hardwicke's "Illustrations of Indian Zoology."

Our Indian species can easily be distinguished from the African bird : 1, by its *small round nostril*, and 2, by its *plain black unbarred tail*. The nostril of the African bird is *long and vertical*, like those of *A. vindhiana*, *A. mogilnik*, and *A. bifasciata*. Its tail also, is a well-barred one, in character like that of *A. vindhiana*.

Some years ago, I sent two of the rare *A. fulvescens* to England for identification ; the one a buff or tawny immature bird, and the other a dark rufous brown adult. By the English ornithologists they were pronounced to be identical with the African *A. naevioides* ; and as such were accordingly entered in our Indian lists. Dr. Jerdon also accepted the identification.

I am glad to have been able at last to find out the mistake, and so to re-establish the fine species so long suppressed on account of its supposed identity with another species. It will be remembered that another species of the same author, *A. bifasciata*, has also been restored to its rightful place, after having been for years confounded with *A. mogilnik* (*A. imperialis*).

The term *A. fulvescens* has been erroneously applied, as Mr. Gurney first pointed out to me, to our common Wokhab, whose correct name is *A. vindhiana*, Franklin : a glance at the plate of *A. fulvescens* in Gray and Hardwicke's work sufficing to shew not this only, but also that the species intended is the rare one hitherto confounded with *A. naevioides*. *A. fulvescens*, by its roundest of round nostrils and plain black tail, is at once distinguished from the other two in any stage of plumage : it has tawny immature plumage and a dark red-brown adult one.

A. naevioides has also a tawny plumage and a darker brown one. Its

fine rich warm colours will at any time separate it from the dull-coloured Indian Wokhab, *A. vindhiana*.

A. vindhiana has a light and a dark plumage; but the light one is merely a pale whity-brown; and this pale plumage instead of being characteristic of immaturity is on the contrary the plumage of the adult bird, as far at least as my observations go. I have repeatedly shot these old whity-brown birds from the nest. Some examples fade more than others, and I believe this pale plumage to be more the result of the colour not being *fast* than the mark of any particular age. I have in one and the same species, *viz.*, in *Aquila nævia*, examples almost black, and others pale sandy brown; so widely different, in fact, are examples of the two extremes of coloration that any one not acquainted with the characters of the species would be much perplexed.

I should observe that *A. fulvescens* is only a cold weather visitant to the plains of India, while *A. vindhiana* and *A. nævioides* are non-migratory species.

I append a description of the specimen of *A. nævioides*, as it may prove useful.

Aquila nævioides, Cuvier.

Whole body plumage, from head to tarsus, a rich light reddish brown or tawny; on the breast and sides are some feathers with part of one web patched with purple brown; wing coverts, both lesser and greater, a mixture of very pale and dark brown, varied with tawny, the pale colour predominating and occupying the margins of the feathers, scapulars and inter-scapulars, rich purple brown, with tawny terminal stripes to each feather; giving the bird a very striped appearance about the shoulders and mantle; primaries blackish, but paler and barred on their inner webs towards the bases; secondaries lighter and pale-tipped, being very conspicuously barred on both webs; tertials still paler, and well-barred on both webs; lining of wing light reddish brown; axillaries the same; lining-feathers under tertials nearly pure white; tail hoary brown, barred in the same manner as that of *A. vindhiana*. There is no conspicuous pale tip. The eyebrow is very distinct and black, much blacker and better marked than in either of the other eagles referred to in this paper. The tibial and tarsal plumes are long and fine, and of as bright a red or tawny, as any other part of the body; the lower tail coverts are also of the same bright tawny red. One peculiar characteristic of this eagle is the strong purple gloss on the brown of the scapulars and upper wing coverts. The nostril is a long vertical one as in *A. mogilnik* and *A. vindhiana*, and also similar to that of *A. bifasciata*.

This is one, and the well known stage of this eagle's plumage, but it

has also another of a darker brown, as shewn in the illustration of the 'Ibis' for April 1865.

Length about 26 inches; wing 19·75; tail 10·5; bill at front 2 in.; from gape 2·4; height at base 1·12; tarsus 3·25; mid toe and claw 3 in.; hind do. 2·25; bill dark horny, bluish grey at base; cere apparently bright yellow; feet the same; claws black.

Hab.—Great Namaqua Land.

2. *Notes on the Certhiinae of India.*—By W. E. BROOKS, C. E.

The author recognizes five species two of which are described as new. The paper will appear in the forthcoming number of the Journal.

3. *On the Muddy Water of the Hugli during the rainy season with reference to its purification and to the Calcutta Water-supply.*—By D. WALDIE, Esq., F. C. S.

Abstract.

The author commenced by referring to a long series of experiments made by him in 1868 and 1869 on the best kind of sand to be used in the filters at Palta for the supply of water to Calcutta, and on the merits of a particular contrivance called Spencer's Regulating Cup proposed to be used in these filters and alleged to be of great value in filtration. His enquiries resulted in the condemnation of that cup as possessing no *special* advantage over other plans for producing the same effect that it had, and in his recommending the employment of a finer sand than that used generally in England, for the filtration of the Hugli water during the rainy season, during which period it is attended with peculiar difficulty. It had been found of late, as the demand for water increased, that the difficulty in supplying it had become very serious. This difficulty had been treated as a failure of the plan adopted, which had been condemned on account of its departure from the principles of filtration recognised in England; and it was proposed to remedy this by reverting to practice founded on these principles and more especially to the use of the Regulating cup.

The author on the other hand maintained the correctness of his results and conclusions, and contended that the proposals just mentioned were founded upon principles fundamentally erroneous, because the real source of difficulty lay in the peculiar quality of the river water during the rains, which caused it to penetrate deep into the sand in a way which English waters similarly treated did not do. He connected this peculiarity with the large rainfall, limited to four or five months of the year, though he could not with certainty explain the reason why it did so. Nevertheless he firmly adhered to it as a fact.

About the 1st of August last, an idea suggested itself to him of a cause by which possibly the peculiarity might be accounted for, and a reference

to experiment shewed that it was correct. The difficulty in the settling of the mud arises from the great state of dilution of the water. Some facts had been long observed by chemists bearing more or less directly on the subject, and special observations had been made, particularly by Skey and Schloesing, on the separation or precipitation of mud from water; a consideration of all these things suggested that if the deficiency of saline matter in the water of the rains was made up by the addition of such matters to it, so as to bring the water up to the standard of that of December or January, the mud would then settle much more readily and possibly be so much altered as to enable the water to be filtered easily. This was found by experiment actually to be the case. The saline matters in the water act as precipitants of the mud if in sufficient quantity: during the rains they are not in sufficient quantity, if doubled they are. Assuming 7 grains of Carbonate of Lime (in solution) as equivalent to the salts of Lime and Magnesia in 100,000 grains of the Húgli water at its extreme degree of dilution, the addition of an equal quantity of Carbonate of Lime (in solution) or of Carbonate of Magnesia (in solution) or of Sulphate of Lime precipitates the mud well. Double the equivalent of Chloride of Calcium is requisite as it has only half the efficacy. The alkaline salts have comparatively little influence. The salts of lime and magnesia, particularly the carbonates, held in solution by carbonic acid, are the chief active ingredients in producing the effect. They cause the very fine particles of clay to coalesce and aggregate into larger and denser ones which in the course of 24 to 48 hours settle well, and the water can then be filtered easily. The clay has been said to be coagulated and the term seems appropriate. *

Corroborative evidence has been found in the peculiarities of some river waters on the European continent, particularly those of Alpine origin, which are liable to occasional unusual dilution and accompanying muddiness, such as the Garonne, from which Marseilles is supplied. A peculiar system of filtration is employed there, appropriate to the purpose. The river waters in England are liable to no such *extreme* changes, consequently their muddy water has no such peculiarities or only to a comparatively small degree.

It was found on extending the enquiry that acids, alkalies and alkaline carths, and many other saline substances possessed the same property, and many of these to a much greater degree. Thus salts of Manganese and Copper and protosalts of Iron are effective in considerably smaller quantities than salts of Lime and Magnesia, and salts of the sesquioxides, namely, Alumina and peroxide of Iron are the most effective of all. Tables are given in the paper shewing approximately the quantities of these substances necessary or sufficient to produce the same effect. The differences in power between common salt and Lime salts, and between Lime salts and Ferric salts are very great.

Thus for instance taking Carbonate of Lime dissolved by excess of Carbonic acid as the standard, Sulphate of Lime is about equally effective, common salt and alkaline salts generally have only about one-twentieth part of the power, Protosulphate of Iron has about six times the power and Persulphate or Perchloride of Iron about forty times the power, so that a very small quantity of persalts of Iron is sufficient. It is to be understood that with the minimum quantities employed a period of from 24 to 48 hours was always given to produce the effect. The quantities necessary are only given as approximations, and there is more doubt connected with those for the salts of the heavy metals and sesquioxides than with those of the earths and alkalies, because, on account of the early cessation of the rains, the river water began to lose its peculiar difficulty in clearing while these salts were being experimented on. The comparison is therefore not so much to be depended on, but the differences in relative power are much greater than had been previously noticed by other observers; this, at least, in their application to this particular water.

The author had quite recently met with Schloesing's original paper which previously he had seen only very briefly and imperfectly abstracted, and found that Schloesing's results were very similar to his own, and that he also suggested similar means for treating highly diluted muddy water difficult to settle, namely, that of restoring it to its natural condition by the addition of Lime salts or other of its normal constituents. But he did not push the enquiry further. The extension to other salts and the discovery of the very small proportion of salts of Alumina and Peroxide of Iron, particularly of the latter, that are sufficient when an interval of 24 to 48 hours is given for settling, to purify the water, so that it can be filtered easily, greatly favours the probability of the application of the principle in practice.

Details are given in the paper.

Mr. Blanford said he had listened with much interest to Mr. Waldie's account of his investigations into the action of salts in solution, in facilitating the precipitation of matter mechanically suspended in the water. Mr. Pedler had found that, by adding to the water a quantity of lime equal to that in solution, and precipitating the whole as insoluble calcium carbonate, (a well known method of softening hard water) the suspended matter, however fine, was carried down with the precipitate but the process described by Mr. Waldie appeared to rest on some different principle, which yet remained to be elucidated. With respect to the regulating cups, which he understood had not been tried by Mr. Waldie, he thought it would have been more satisfactory if he had experimented upon them before utterly condemning them. Looking at the question from an *a priori* point of view, it certainly seemed that an upward filtration is likely to be more effectual in removing fine matter in suspension than the downward method; and he knew that Mr. Clark had much confidence in these cups.

Dr. Waldie then exhibited one of the Spencer's cups and explained that the water was completely filtered before it reached the cups and so there could not possibly be any upward filtration; all that the cups could do was to prevent more than a certain quantity of water passing in a given time, which could be done equally well or better by other arrangements. The cup had been actually tried during the whole rainy season of 1869 and the conclusions come to had been derived from these experiments.

Mr. H. B. Fenwick C. E., in charge of the Water Works at Palta, gave a brief description of some experiments made with the Spencer's cups which proved conclusively that they would not answer the purpose intended.

Mr. Fenwick said, that at Mr. Clark's suggestion he had tried the cups; a filter 12' \times 12' was constructed at Palta fitted with four of Spencer's regulating cups and was supplied from the same source as the large filters. The discharge was found to be in proportion to that of the large filters as 3 to 1; the materials were then removed and four of the holes in each regulating cup stopped up, the discharge then amounted to $2\frac{1}{2}$ to 1; two more were then stopped up, thereby reducing the original ten holes to four in each cup, and the discharge was then 2 to 1 in proportion to that from the large filters. During the rainy season the water which flowed from this filter was very much inferior in transparency to that from the large filters during the same period, in fact it was very inferior to that from the large filters at their worst.

4. *On the Climate of Bengal.*—By H. F. BLANFORD Esq.

Although Bengal is situated for the most part without the tropical zone, its climate is characteristically tropical. The mean temperature of the whole year varies between 80° in Orissa and 74° in Asám; that of Calcutta being 79° .

In the annual range of the temperature, as well as in point of humidity and rainfall, the eastern and western portions of the province are strongly contrasted. In Kachár, nearly 200 miles from the sea, the mean temperature of June is 82° , that of January $61\cdot5^{\circ}$, and the highest and lowest temperatures recorded during 5 years, *viz.*, 99° and 43° shew an absolute range of 56° only. At Chátgáon, on the sea coast, the recorded range does not exceed 49° . On the other hand, Patna has a mean temperature of $87\cdot2^{\circ}$ in June and $60\cdot7^{\circ}$ in January; and in 1869, the highest and lowest temperatures registered were $116\cdot5^{\circ}$ on the 12th May, and $36\cdot9^{\circ}$ on the 3rd and 4th of January; the absolute range of this single year was therefore $79\cdot4^{\circ}$. It is probable that some parts of Bihár, the neighbourhood of Gya for instance, experience a range somewhat greater than that of Patna.

The highest temperature recorded in Calcutta during the last 18 years is 106° , which has been reached twice only; *viz.*, in May 1867 and again in May of the present year. The lowest temperature $52\cdot7^{\circ}$ has been record-

ed also twice, *viz.*, in January 1860 and 1864, and $52^{\circ}8'$ has been observed twice, *viz.*, in January 1857 and 1861. The extreme absolute range of the temperature of the Capital is therefore a little over 53° , and the mean temperatures of December and May are $68^{\circ}5'$ and 85° respectively. The annual rise and fall of temperature exhibits some other local variations. Thus in Orissá and the Western part of the Gangetic Delta, December is the coldest month of the year; elsewhere the temperature reaches its minimum in January. This difference is due to the sea-winds setting in on this part of the coast very early in the year; whereas on the Arakan coast and in Bihár, their influence is not felt till much later in the season.

May is the hottest month of the year in all parts of the Lower Provinces with the exception of a part of Bihár, Asám and Kachár. In the former, the average temperature of June is a little above that of May; and in the latter districts, which enjoy a comparatively cool but humid atmosphere in April and May, the temperature rises slowly and uniformly up to July or August. In upper Asám it is higher than in the lower part of that province, from May to October; and higher also than in Kachár. The mean temperature of Síbságar in July and August is $84^{\circ}7'$, that of Goalparah $81^{\circ}2'$, and that of Silchár 82° .

During the rains, the temperature of the Hazáribágh plateau, to the West of the Delta, falls more rapidly than that of any other part of Bengal. Between May and October, the fall at Hazáribágh is rather more than 11° ; while at Barhampúr, under about the same latitude, it is only $4\frac{1}{2}^{\circ}$; at Calcutta little more than 3° , and even at Patna it does not exceed 8° . This peculiarity appears to be due principally to the cloudiness of the plateau in the daytime, whereby the sun's heat is rendered less intense; and to the greater radiation at night. This fact has an important bearing on the value of Hazáribágh as a station for European troops, and as a sanitarium for invalids from the plains.

The high humidity of the atmosphere in Bengal, and more especially in its Eastern districts, has become proverbial; and if the term be used in reference to the quantity of vapour in the air, as measured by its tension, the popular belief is justified by observation. But if used in the more usual sense of Relative Humidity, that is, as referring to the percentage of vapour in the air, in proportion to that which would saturate it, the average annual humidity of a large part of Bengal is considerably lower than that of England. In illustration of this, I give a comparative table of the mean vapour tension and relative humidity of London and Calcutta in each month of the year, and the mean of the whole year; the data for the former place being taken from an Essay on the Climate of London by the late Professor Daniell; those for the latter from the results of the hourly observations registered at the Surveyor General's Office, Calcutta, and computed in the Meteorological Office

of Bengal. The former are deduced from 17 years, the latter from 14 years observations.

Mean vapour tension in thousandths of an inch.

	Jan.	Feb.	Mar.	Ap.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	YEAR.
London, ...	·245	·264	·280	315	·340	·490	·534	·530	·468	·389	·310	·281	·376 inch.
Calcutta, ...	·487	·549	·695	·805	·889	947	·954	·950	·950	·828	·605	·489	·762 „

Mean Relative Humidity.

SATURATION 100.

	Jan.	Feb.	Mar.	Ap.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	YEAR.
London, ...	97	94	89	84	82	82	84	85	91	94	96	97	89
Calcutta, ...	71	68	67	69	73	81	85	86	85	78	73	72	76

The quantity of vapour in the air of Calcutta, relatively to the dry air, is then, on the average of the year, about twice as great as in that of London ;* but the relative humidity of the former equals that of the latter only in the three first months of the rains, which are among the driest months of an European climate.

The absolute humidity of the atmosphere is greatest on the coast of Orissa and the Sunderban, and diminishes inland as the distance from the sea increases. In the cold weather and spring months, this decrease is rapid everywhere, except in Eastern Bengal. In Kachár, however, the quantity of moisture in the air is as great as on the coast of Chátgáon, and even exceeds it, excepting between the months of February and May. During the hot weather months, the proportion of vapour to dry air increases steadily and rapidly in all that part of Bengal in which the hot westerly winds are not a regular phenomenon of the season ; that is to say, on the Gangetic delta, in Eastern Bengal, and on the maritime plain of Orissa ; but on the high ground further west and in Bihár, as well as generally in the N. W. Provinces, its increase is slower up to May or June, and it then rises rapidly

* In Calcutta the vapour of water constitutes on an average about two and a half per cent. by volume of the atmosphere ; in London only one and a quarter. Next to the temperature, this is perhaps the most important climatal difference of the two places in all that affects health.

almost to an equality with that of the maritime region. This is clearly traceable to the winds ; since, in the former region, winds from the sea predominate throughout the hot season, mitigating its temperature indeed, but at the same time rendering the atmosphere damper ; and producing, when the air is calm, that oppressive feeling of sultriness, which is so trying to persons accustomed to the drier atmosphere of Bihár and the North-West.

The relative humidity of air or its nearness to saturation depends on the temperature as well as on the absolute quantity of vapour it contains. If the latter be constant, the air, as is well known, is drier with a high temperature than a low one. Thus arises, in the cold weather months, the apparent anomaly that, although the *absolute* humidity of Upper India at that season is considerably less than that of Bengal, its *relative* humidity does not undergo a corresponding diminution, owing to its lower temperature. At Banáras for instance and even at Láhor, as appears from the Panjáb reports, the relative humidity of the air in January and February exceeds that of Dháká and Barhampúr. In this sense the driest period of the year falls later and later in the spring months as we proceed inland. At Ságar Island, January is the driest month ; at Calcutta, February and March ; at Patna, April ; at Banáras, April and May ; while at Láhor and all places in the Panjáb, May and June are the months of greatest siccidity. The frequency of rain depends on relative rather than absolute humidity ; the quantity of rain that falls, other things being equal, chiefly on the absolute humidity of the air.

Eastern Bengal, including Kachár and Silhet, and the Himálayan Tarai, are the districts of the heaviest rainfall. Their average annual fall almost every where amounts to 100 inches ; and on the exposed hill flanks, and at their foot, even this large amount is greatly surpassed. Thus Silhet has an annual average of 141 inches. Darjiling 126 inches, the Rangbí Cinchona plantation 175 inches, Buxa Fort 280 inches, (the average of three years,) and Cherra Púnji the enormous amount of 527 inches ; this last is the highest average rainfall hitherto recorded in the world. The rainfall is also higher on the plains of the coast than on those lying more inland. Thus Ságar Point has an average of 87 inches and Calcutta 66, False Point 74 inches and Katak 52·5. The lowest rainfall in the provinces under the Bengal Government is that of the Southern portion of Bihár, including Monghyr, Gya and Patna, where the annual fall does not much exceed 40 inches ; and in the case of the last mentioned station is only 37 inches. North of the Ganges, it increases gradually up to the Himálaya ; and, on the south, up to the high ridge of forest-clad country which is drained by the Son, the Damúdar and their tributaries. In this tract, where the monsoon winds from the opposite coasts of India meet, the fall of the few stations that have hitherto furnished registers, ranges between 50 and 60 inches. In

Calcutta the highest rainfall on record is that of 1871, when it amounted to 93·31 inches; the lowest during the last forty-five years is that in 1837, when the registered fall was as low as 43·61 inches. In subsequent years the lowest falls were those of 1838 (53·? inches), 1853 (52·08 inches) and 1860 (52·61 inches); up to the present year 1873, which now, (in November.) exceeds that of 1837 by about one inch only. The Cherra Púnji register of 1861 records a fall of 805· inches, of which 366· inches fell in the month of July alone; but it is not clear that this register is deserving of complete reliance. Twelve inches of rain in one day is however, far from unusual at Cherra Púnji. On the 18th June, 1861, an equal quantity fell in Calcutta within 24 hours, and on the 11th May 1835 the same quantity fell within three hours.

By far the greater part of the rainfall of Bengal falls between the months of June and October. Showers occur also in the hot weather months, and in the months of February and March hail-storms are not infrequent. In the Eastern districts, rain occurs occasionally in the cold weather months, but is less common in the Delta and the country further Westward, excepting in the N. W. Provinces and the Panjáb. In the Eastern districts and in Asám, rain is more abundant in all the earlier months of the year, and in April it sets in heavily, and reaches its maximum about June or July. Further to the West, the rains usually set in in June, and July and August are the months of the heaviest fall.

Except at the hill stations and in the immediate neighbourhood of the hills, the average proportion of cloud-covered sky varies between one-third and one-half of the whole. At Darjiling, on an average, the proportion of clouded sky to sunny sky is as 2 to 1. In Lower Bengal generally it is about 1 to 2; being however, rather higher on the coast. December and January are on the whole the brightest months of the year; but November, February and March are almost equally serene. June, July and August are the months of greatest obscurity. In these former months, the proportion of cloud is on an average from 10 to 15 per cent., in the latter months from 65 to 85 per cent.

These observations refer to visible dense cloud, but the depth of the sky tint indicating the pressure or absence of diffused cloud in the upper regions of the atmosphere would appear to follow a different law. No systematic observation has been made on the colour of the sky, but as the results of my own casual observations I gather that the sky tint is, on an average, much paler in the cold weather, than during fine intervals of the rains, indicating a greater quantity of condensed moisture at great altitudes.

The wind system of Bengal is so often referred to as a familiar illustration of the monsoons, that it might seem almost superfluous to re-describe a subject treated of in every text book on Meteorology. But it appears

from recent investigations, that, however well known at sea, the character and origin of the monsoons on the land have been very generally misunderstood. The monsoons are not two undivided currents, flowing to and from Central Asia during about equal periods of the year; but appear rather to consist, at each period, of at least two principal currents, the one tending to or from Northern India, the other to or from the interior of China; and there are probably other minor currents originating or terminating at other centres. The Indian branch of the winter monsoon originates in the plains of the Panjáb, the Gangetic valley, and the uplands of Central India; also in upper Asám; and blows as a very gentle wind towards the two great bays that wash the East and West coasts of the Peninsula. During this season, a Southerly wind prevails steadily on the Himalaya at heights above 6000 or 8000 feet, descending lower on the Western than on the Central part of the range. This appears to be the upper return current of the winter monsoon, and corresponds to the anti-trade of the trade wind region. It descends on the plains of Upper India, where the atmosphere is characteristically calm at this season; and brings the winter rains. It is less frequently felt in Lower Bengal, where the wind is variable from North and North-West; but to the eastward in Kachár, southerly winds are very prevalent at the winter season. In Northern India the two branches of the northerly monsoon appear to diverge towards the opposite coasts, from a line characterized by a ridge of higher mean barometric pressure, which passes from the Panjáb through Banáras to Katak. This monsoon ceases on the coast line of Bengal in the month of February, when in the lower atmosphere, sea winds set in. At first these are restricted to the immediate neighbourhood of the coast; but as the season advances and the heat of the interior plains rises under the influence of the returning sun, they penetrate further and further inland, and are drawn from greater distances at sea. In the interior of India, the wind becomes more Westerly, and blows towards Lower Bengal and Chutiá Nágpúr, not as a steady current, but as day winds, which in April and May are highly heated by the parched and heated soil, and constitute the well known hot winds of those months. Where these two currents meet, the thunder-storms well known as North-Westers are generated. Like the thunder-storms of Europe and the dust-storms of the Panjáb, they are due to convection currents; and in Bengal owe their prevailing movement from the West or North-West quarter to the strength of the land wind, which maintains its course in the upper atmosphere above the opposite sea-wind which is felt at the land surface. At this time the N. W. wind continues to blow unsteadily in the South of the Bay; but calms are not infrequent; and it is not till June that the Southerly winds of the bay become continuous with the South East Trades of the South Indian Ocean, and that the South West monsoon, pro-

perly so called, sets in in India. This blows from both coasts, and the two branches meet along a line which about coincides with the Southern margin of the Gangetic plain. Both tend towards the Panjab, the region of the greatest heat at this season; and becoming gradually drained of their vapour in their passage over the land, that which remains on their reaching the plains of that province, suffices only to afford a scanty rainfall, inadequate to mitigate the temperature, and only rendering the heat more oppressive by increasing the relative humidity and diminishing the evaporative power of the air.

As an element of climate, apart from its secondary effects on the winds and consequently on the humidity, rainfall, &c., the pressure of the atmosphere is, as far as is known at present, of subordinate importance. In Bengal, as in most tropical countries, its variation, except during the passage of cyclones, is small; scarcely amounting to an inch on the extremes of the year. The average pressure of the air in Calcutta, 18 feet above sea level, is equal to that of a column of mercury at the freezing point, 29·793 inches in height or to 14·6 lbs. on the square inch. It is highest in December, when the mean pressure, similarly estimated, amounts to 30·041 ins.; and lowest in June and July when it falls to 29·551 ins. on the average of the month. The daily variation is greatest in April, when the barometer falls on an average 1·41 inch between 9 A. M. and 5 P. M.; and least in July, when the corresponding change does not exceed 0·090 inch, and the day and night barometric tides are nearly equal. The irregular variations being small as compared with those experienced in extra-tropical countries, and the regular variations so much more strongly marked, it follows that, as a weather-glass, the barometer is apt to mislead persons who are unacquainted with the laws of its local changes; since the rough generalizations, which serve to interpret its action in Europe, no longer hold good even approximately in India. In certain cases indeed, its action would seem to be anomalous. Thus it generally rises rapidly before one of those thunder-storms that are so common in the hot weather; and at Cherrá Púnji, the extraordinary rainfall of which would lead most persons to anticipate a generally low pressure during the rainy season, after allowing for differences of elevation, the pressure is, on an average, considerably higher than in Western Bengal, the N. W. Provinces and the Panjáb at this time of the year. Moreover, it appears from information supplied by Major H. H. Godwin-Austen that at this place the barometer rises before heavy rain, and remains high as long as the rain continues. When interpreted with proper precautions, the barometer is, nevertheless, as trustworthy and valuable a monitor of impending weather in India as it is elsewhere.

The storms prevalent in Bengal are of two classes. First those of the hot weather already noticed, which are formed over the land, and are of the nature of convection currents, like the summer storms of Europe; and second,

those more extensive and destructive storms, that originate over the Bay of Bengal, and are most frequent at the changes of the monsoons. These latter have received the distinctive name of Cyclones; and the name is perhaps as good as any other, since in them a vorticose motion of the wind is a strongly marked character, and one of great practical importance; but it is by no means a character peculiar to these storms, since it may frequently be observed in a slight degree in the ordinary North-Westers, and Tornados which are apparently merely a severe form of the North-Wester, and differ from a typical cyclone only in their originating over the land, in their inferior size and shorter duration. It may be indeed that the direction of their circulation is not so constant as in the greater storms, but existing evidence is insufficient to settle this point. The dust-storms of the Upper Provinces also, have been shewn by Dr. Baddeley to consist of one principal and numerous minor vortices, exactly like the larger storms of oceanic origin. The pressure of the wind in Tornados and even in ordinary North-Westers is sometimes comparable with that of cyclones, and, within a limited area, the former are not less destructive. There is an important difference in the character of the surface wind in these two forms of land storms. In the North-Wester the violent wind usually precedes the storm, blowing outwards, and being in fact a descending current brought down by the friction of the falling rain. The centripetal currents which feed the storm are not felt at the ground surface, though they may frequently be traced in the motions of the lower clouds. In the Tornado, on the other hand, as in the true cyclone, the violent surface winds are centripetal and vorticose.

The Cyclones felt in Bengal begin, in all cases, over the Bay; and the more violent and extensive storms, which alone reach the land, probably require many days to form before they move forward from their place of origin. Some of the most destructive that have passed over Bengal, have proceeded from the neighbourhood of the Andaman and Nicobar Islands. Their relative frequency in the different months of the year is shewn in the following table, which includes storms of all parts of the Bay, and those that have been felt on all parts of its coasts, Bengal included.

January,	2	May,	17	September,	3
February, ...	0	June,	4	October,	20
March,	1	July,	2	November,	14
April,	5	August,	2	December,	8

Of these seventy-three storms, twenty-three have been felt in Bengal or on its coasts, and all between the months of April and November inclusive. Their course is usually North across the Gangetic Delta, North West from the Orissa coast. The motion of the wind is in an involute spiral, revolving in a direction opposite to that of the hands of a clock; as in all cyclonic storms in the Northern Hemisphere. The greatest pressure of the

wind in these storms has yet to be ascertained. The highest that has been registered in Calcutta, by an Osler's Anemometer, is 50 lbs. to the square foot; but this was in a storm of no remarkable violence, and one which did but little injury in Calcutta. The centre of the storm, at the time, was passing some 15 miles to the East of the city, and the barometer stood at 28.712. In the far more severe storms of the 2nd November, 1867 and the 5th October, 1864, the Anemometer was blown away, under a pressure of 36 lbs. to the square foot, so that no register of their maximum force was obtained. There is a prevalent impression that cyclonic storms have been more frequent of late years than formerly, but the belief does not appear to rest on any sound basis of fact. Since the destructive storm of October, 1864, the attention of the public has been attracted to the subject more steadily than in former years; and many a storm that would have escaped notice, or, if reported in a newspaper paragraph, would have been speedily forgotten, is now made the subject of general conversation for the time, and recorded with all procurable detail, in the annual Meteorological Reports. To this cause probably may be attributed the popular belief in the greater frequency of storms in recent years. 1869 and 1872 were both stormy years.

The reading of the following papers was postponed—

1. On a secondary sexual character in *Squilla raphidea*, Fabr. By J. Wood-Mason, Esq.
2. Enumeration of Burmese Palms. By S. Kurz, Esq.,
3. Note on two Muhammadan Gold Coins. By the Hon'ble E. C. Bayley, C. S. I.
4. On the Ruins of Dímápúr, in the Nágá Hills. By Major H. H. Godwin-Austen.

LIBRARY.

The following additions have been made to the Library since the meeting held in August last.

Presentations.

. Names of Donors in Capitals.

Royal Society, Proceedings, Nos. 144-145.

No. 144. *J. Norman Lockyer*—Researches in Spectrum-Analysis in connexion with the Spectrum of the Sun. No. II. *Major W. A. Ross*—On Jeypoorite, a Sulph-antimonial Arsenide of Cobalt. *C. Meldrum*—On a periodicity of Rainfall in connexion with the Sun-spot Periodicity.

No. 145. *H. G. Bastian*—Further observations on the temperature at which *Bacteria*, *Vibriones*, and their supposed Germs are killed when exposed to heat in a moist state; and on the causes of Putrefaction and Fermentation. *C. C. Fode* and *E. R. Lankester*,—Experiments on the Development of *Bacteria* in Organic Infusions.

T. Lauder Brunton and *J. Fyfe*—On the Nature and Physiological Action of the Poison of *Naja Tripudans* and other Indian Venomous Snakes. *F. Chambers*,—The

Diurnal Variations of the Wind and Barometric Pressure at Bombay. *W. K. Parker.*
—On the structure and development of the Skull in the Pig (*Sus scrofa*). *Lieut.-Col. A. R. Clarke.*—Results of the comparisons of the Standards of Length of England, Austria, Spain, United States, Cape of Good Hope, and of a Second Russian Standard, made at the Ordnance Survey Office, Southampton.

THE ROYAL SOCIETY OF LONDON.

Zoological Society of London, Transactions, Vol. VIII, Parts 4-5.

Part V. *P. M. Duncan.*—A Description of the *Madreporaria* dredged up during the Expeditions of "H. M. S. Porcupine" in 1869 and 1870.

THE ZOOLOGICAL SOCIETY OF LONDON.

Geological Society, Quarterly Journal, No. 114.

THE GEOLOGICAL SOCIETY OF LONDON.

Statistical Society, Journal, Part I, 1873.

THE STATISTICAL SOCIETY OF LONDON.

Royal Geographical Society, Proceedings, Vol XVII, No. 2.

Goldsmid.—Journey from Bunder Abbas to Mush'had by Sistan. *Rawlinson.*—Notes on Seistan. *Rawlinson.*—On Badakshan and Wakhan.

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Institution of Mechanical Engineers, Proceedings, May, 1873.

C. W. Cooke.—On Wenham's Heated-Air Engine.

THE INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

Anthropological Institute, Journal, Vol. III, No. 1.

W. L. Distant.—The Inhabitants of Car Nicobar. *Sir Duncan Gibb.*—On the Looshais

THE ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

East Indian Association, Journal, Vol. VII, No. 1.

THE EAST INDIAN ASSOCIATION OF LONDON.

Hand-List of the Specimens of Shield Reptiles in the British Museum by Dr. J. E. Gray.—Catalogue of the specimens of *Hemiptera Heteroptera* in the British Museum, Parts VII, and VIII, by F. Walker.—Catalogue of the Syriac Manuscripts in the British Museum, by W. Wright.

THE TRUSTEES OF THE BRITISH MUSEUM.

Journal Asiatique, VII^e Série, No. 3.

M. E. Renan.—Note sur deux inscriptions Nabatéennes. *Ch. Bruston.*—L'inscription de Dibon, traduite et annotée *M. Ad. Neubauer.*—Un Commentaire Samaritain inconnu.

THE ASIATIC SOCIETY OF PARIS.

Société Anthropologique, Bulletins, 11^e Série, Tome VIII, Fasc. I.

De Quatrefages.—Sur les populations du bassin de l'Amour. *Faidherbe.*—Sur les dolmens d'Afrique.

THE ANTHROPOLOGICAL SOCIETY OF PARIS.

Société Géographique, Bulletin, Juin, 1873.

Khiva (Extrait d'un article du Colonel Venioukof), (suite et fin).—Esquisse du pays à l'est de la mer Caspienne et de la mer d' Aral.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Académie National des Sciences de Bordeaux. Actes, 3^e Série, 34^e Année, Trimestres 1-2.

THE NATIONAL ACADEMY OF SCIENCES, AND ARTS OF BORDEAUX.

Société Royale des Sciences de Liège. Mémoires, 2^{me} Série, Tome 3.

J. Sichel.—Considérations zoologiques sur la détermination de l'espèce. E. Charlier.—Observations de tératologie.

THE ROYAL SOCIETY OF SCIENCES OF LIE'GE.

Monatsbericht, Februar, März und April, 1873.

März und April. Lepsius.—Über Magnet und Eisen bei den alten Aegyptern. Weber.—Über das Mahābhāshya des Patanjali, nach der im vorigen Jahre in Benares erschienenen Ausgabe.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Norges Officielle Statistik, udgireen i Aaret 1869-1872.—Criminal statistiske Tabeller for Kongeriget Norge for Aaret 1865, 1866, 1868, 1869, 1870.—Fattig-Statistik for 1867, 1868, 1869.—Beretning om Skolere Æsensets Tilstand, for 1867, 1868, 1869, 1870.—Tabeller Vedkomende Skiftevæsenet i Norge, 1868, 1869, 1870.—Oversigt, 1869, 1879.—Den Norske Statstelegrafs Statistike for 1869, 1879.—Kommunale Forholde i Norges land—og By Kommuner, 167-68.—De Offentlige Jerubaner, 1871.—Tabeller vedkommende Norges Handel og Skibsfart, 1864, 1869, 1870, 1871.—Beretninger om Amternes Æconomiske Tilstand, 1866-70.—Tabeller vedkommende Falkenmængdens Bevægelse, 1856-65.

Lappisk Mythologi, J. A. Friis. Den Norske Lodo, udgiven af den Geografiske opmaaling, Hefte 1. Den Norske Turistforenings Arbog for 1871. Forhandlinger i Videnskabs Selskaleet i Christiania, aar 1871. Nyt Magazin for Naturvidens kaberne, xix, 1 og, Hefte 2. Statistisk Handbrog for Kongeriget Norge. On the Rise of land in Scandinavia by S. A. Sexe. Recherches sur la Chronologie E'gyptienne, par J. Lielbein. On some remarkable forms of Animal Life, from the great deeps, off the Norwegian Coast, by G. O. Sars. Forekomster af Kise i Visse Skifere i Norge, ved E. B. Münster Carlinologiske Bidrag til Norges Fauna, af G. O. Sars, (mysider). De Skandinaviske og Arktiske Amphipoder, af Axel Boeck. Die Pflanzenwelt Norwegens, von Dr. F. C. Schübeller. Anvisning til Konstruktion af Lystfarløler og Bade, af, C. Archer. Norsk Meteorologisk Aarbag for 1871.

THE ROYAL UNIVERSITY OF NORWAY, CHRISTIANIA.

Bulletin, Tome XLVI, Nos. 3, 4.

No 3. N. Lubimoff.—Neue Theorie des Gesichtsfeldes und der Vergroesserung der optischen Instrumente. Victor Motschoulsky—Énumération des nouvelles espèces de coléoptères rapportés de ses voyages. (Contains notices of some Indian species).

THE IMPERIAL SOCIETY OF NATURALISTS, MOSCOW.

Bijdragen tot de Taal-Land-en Volkenkunde, 8^e Volgr., Deel VII, Stuk 1, 2.

St. 1. *Dr J. Pijnappel*.—Over de kennis, die de Arabieren voor de komst der Portugeezen van den Indischen Archipel bezaten. *Dr. J. Pijnappel*.—Enkele Aanmerkingen op Wallace's Insulinde.

THE ACADEMY OF SCIENCES OF NETHERLANDS-INDIA.

Proceedings, Parts 1-3, 1872.

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

Calcutta Journal of Medicine, July 1873.

THE EDITOR.

Rámáyana, 3rd vol, 8th part.

THE EDITOR.

The Christian Spectator, Sept. 1873.

THE EDITOR.

Holi, Devi-Chhadam Lilá, Premásru-varshan, Prema-phula várí, Phulon-ká-Gucheluhá, Vedic killing is not a killing, Jaina-Kutíhala, Vidyásundara Nataka, Agarválnon-ki utpatti, Sujána-Satak, by Harischandra.

THE AUTHOR.

Pákhanda Vidamvana, by Kaví Kishna.

Sundarí-Tilaka, by Mannulala.

Gopála-lilá-kávyam, by Rámachandra.

HARISCHANDRA.

Nidana, translated by Udayachanda Datta.

THE TRANSLATOR.

A Travel to Western India, by Kedar Nath Dass.

THE AUTHOR.

Grammar of the Bengali Language, by W. Carey.

BA'BU RA'JENDRALA'LA MITRA.

Minutes of the Trustees of the Indian Museum, April 1872 to March 1873.

THE TRUSTEES OF THE INDIAN MUSEUM.

Catalogue of MSS. from Gujrát, No. 4.

THE GOVERNMENT OF BOMBAY.

Report on the Meteorology of the Panjáb for 1872.

THE GOVERNMENT OF THE PANJÁB.

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THE GOVERNMENT OF BENGAL.

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Flora Sylvatica, by Beddome, Part XVII.

THE GOVERNMENT OF INDIA.

The Indian Antiquary, August, 1873.

Major J. W. Watson.—Story of Rani Pingala.

THE GOVERNMENT OF INDIA.

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The Quarterly Review, Nos. 267, 268, 269.

No. 268. Central Asia.

The Westminster Review, January, April and July, 1873. Nos. 85—87.

No. 87. Emigration and the Coolie Trade in China.

The Quarterly Journal of Science, January, April, July, 1873. Nos. 37—39.

No. 37. *W. Crookes*.—On the probability of Errors in Experimental Researches.—*R. A. Proctor*.—Condition of the Moon's surface. A solution of the Sewage Problem.—

No. 38. Atmospheric Life Germs. *Capt. S. P. Oliver*—The Dolmen mounds and Amorpholithic monuments of Brittany.

No. 39. *M. Ponton*.—Actinism and Magnetism. *W. W. Wood*.—The Mineral Riches of the Philippines.

The Edinburgh Review, Nos. 279, 280, 281.

No. 279. The Administration of Berar.

No. 280. Trade Routes to Western China.

No. 281. Recent events in Afghanistan.

The Annals and Magazine of Natural History, Vol. II. Nos. 61—68. January to August, 1873.

No. 61. *R. Swinhoe*.—On a new species of *Nettapus* (cotton-teal) from the river Yangtze. *M. F. Plateau*.—Physico-chemical Investigations upon the Aquatic *Articulata*. *O. C. Marsh*.—Notice of new and remarkable Fossil Birds.

No. 62. *E. R. Lankester*.—Summary of Zoological observations made at Naples in the winter of 1871-72. *Dr. J. E. Gray*.—Notes on Tortoises. *Dr. J. E. Gray*.—On a new Freshwater Tortoise from Borneo (*Orlitta Borneensis*).

No. 63. *Dr. J. E. Gray*.—On the original Form, Development and Cohesion of the Bones of the Sternum of *Chelonians*, with Notes on the skeleton of *Sphargis*. *H. J. Carter*.—On Whales in the Indian Ocean. *O. C. Marsh*.—On a new Sub-class of Fossil Birds. *Dr. J. E. Gray*.—On two new Free Sponges from Singapur. *A. Schneider*.—On the developmental History of *Petromyzon*.

No. 64. *Professor Ernst Hæckel*.—On the *Callispongiae*, their position in the Animal kingdom and their relation to the Theory of Descendence. *Dr. J. E. Gray*.—Observations on Pigs (*Sus*, Linnæus; *Setifera*, Illinger); and their skulls, with the description of a new species. *F. Smith*.—Description of a new Species of Fossorial *Hymenoptera* in the collection of the British Museum.

No. 65. *E. Ray Lankester*.—On the Primitive Cell-layers of the Embryo as the bases of Genealogical classification of animals, and on the origin of Vascular and Lymph systems. *H. J. Carter*.—Points of distinction between the *Spongiariae* and the *Foraminifera*. *Dr. J. E. Gray*.—On the definition of *Rhinoceroses* (*Rhinocerotes*) and on the characters afforded by their skulls. *E. Fuvre*.—On some works relating to a new classification of *Ammonites*.

No. 66. *Alphonse de Candolle*.—On the advantage of a Dominant Language for Science. *Dr. A. Günther*.—Contribution to our knowledge of *Ceratophrys* and *Megalophrys*.

No. 67. *W. King*.—On some characters of *Lingula anatina* illustrating the study of Fossil Palliobranchs. *H. J. Carter*.—On two new species of *Gumminæ* with special and general observations. *Dr. J. E. Gray*.—Description of two new Species of Bush-buck (*Cephalophus*) from Western Africa. *A. W. E. O'Shaughnessy*.—Herpetological Notes. *J. Wood-Mason*.—On *Nephropsis Stewarti*, a new genus and species of

Macrurous Crustaceans, dredged in deep water off the Eastern Coast of the Andaman Islands. *Dr. J. E. Gray.*—Notes on the Family *Chelydradae*. *T. Gill.*—Note on the *Scombrocottus salmoneus* of Peters, and its identity with *Anoplopoma fimbria*. *Dr. F. Kraass.*—The skeleton of *Sphargis coracla* from Surinam. *Dr. J. E. Gray*—*Damonia unicolor*, a new species of Water-Tortoise from China, sent by Mr. Swinhoe. *M. Bava.*—On *Hylodes Martinicensis* and its Metamorphoses.

No. 68. *A. G. Butler.*—Answer to Dr. Stoliczka's Notes on Indian species of *Thelyphonus*. *A. G. Butler.*—A monographic Revision of the genus *Phrynus* with descriptions of four remarkable new species. *H. W. Bates.*—On the Longicorn Coleoptera of Japan. *Dr. J. E. Gray.*—Notes on Chinese land-Tortoises (*Trionychia*), with the description of a new species. *Dr. J. E. Gray.*—On the Deer of the West Coast of South America, with the Description of a new species from Peru. *Royal Society.*—Dr. W. Kowalewsky on the Osteology of the *Hyopotamidae*. *Dr. J. E. Gray.*—On the Skull of the spectacled Bear of Peru and of the *Helarctos* from Malacca and Java. *Dr. J. E. Gray*—On the Skeleton of *Kogia Macleayi*. *Dr. J. E. Gray.*—On a Salamander from Shanghai.

The London, Edinburgh and Dublin Philosophical Magazine, January—August, 1873. Nos. 297—304.

No. 298. *O. Heaviside.*—On the best arrangement of Wheatstone's Bridge for measuring a given resistance with a given Galvanometer and Battery.

No. 299. *T. P. B. Warren.*—On a method of testing Submarine Telegraph Cables during Paying-out.

No. 300. *O. Heaviside.*—On an advantageous method of using the Differential Galvanometer for measuring small Resistances. *L. Schwendler.*—On Differential Galvanometers (Reprint from Journal Asiatic Society of Bengal). *A. S. Davis.*—The Vibrations which Heated Metals undergo when in Contact with Cold material, treated mathematically.

No. 301. *A. M. Mayer.*—On the effects of Magnetization in changing the Dimensions of Iron, Steel and Bismuth bars, and in increasing the interior capacity of hollow Iron Cylinders.

No. 302. *O. Heaviside.*—On Duplex Telegraphy. *H. Wilde.*—On some improvements in Electromagnetic Induction Machines.

No. 304. *J. W. S. Glaisher.*—On the form of the Cells of Bees.

Journal of the Chemical Society, 1873, May—July.

May. *J. H. Gladstone* and *A. Tribe.*—Researches on the Action of the Copper-zinc Couple on Organic Bodies. *J. H. Gladstone* and *A. Tribe.*—Observations on the Nature of the Black Deposit on the Copper-zinc Couple.

June. *H. Sprengel.*—A Method of determining the Specific Gravity of Liquids with ease and great exactness.

July. *Dr. C. W. Siemens.*—On smelting Iron and Steel.

The Numismatic Chronicle, 1873 Parts 1-2.

Part I. *S. E. L. Poole.*—On Mint characteristics of Arabic coins.

Part II. *S. E. L. Poole.*—On the coins of the Muwahhids in the British Museum.

The Ibis, 1873, January, April and July. Nos. 9—11,

No. 9. *R. Swinhoe.*—On a new species of Little Bittern from China. *A. Anderson.*—On the Nidification of certain Indian Birds. *E. Blyth.*—Addenda to the Avifauna of India. *Dr. J. Murie.*—Fragmentary Notes on the Guacharo or Oil-bird

(*Steatornis Caripensis*). *W. T. Blanford*.—Descriptions of new species of *Nectarinia Silka* and *Parus* from Persia and Baluchistan.

No. 10. *Capt. J. H. Lloyd*.—On a new species of Barbet from Western India *P. I. Sclater*.—Note on the *Pyrrangula roseogularis* of Cabot. *R. Swinhoe*.—On a new Chinese Owl of the genus *Ketupa*. *R. B. Sharpe*.—On the genus *Platystira* and its Allies. *T. Salvadori*.—Note on *Homochlamys lusciniæ*, Salvad. *Dr. J. Murie*.—On the *Upipidae* and their relationships. *W. T. Blanford*.—Notes on "Stray Feathers." *W. T. Blanford*.—Description of a new Jay and a new Woodpecker from Persia.

No. 11. *R. Swinhoe*.—On the Rosy Ibis of China and Japan (*Ibis nippon*). *J. E. Harting*.—On a rare or little known *Limicola*. *O. Salvin and D. G. Elliot*.—On two species of *Trochilidae* of the Genus *Lophornis*. *G. N. Lawrence*.—Remarks on *Neomorphus pucherani* and its Allies. *Arthur Viscount Walden*.—On a Collection of Birds recently made by Lieut. R. W. Ramsay.

Revue des Deux Mondes, 1873, Jan.—Aout.

15 Fev. *M. Jules Clavé*.—Orissa, une Province Anglaise de L'Inde.

15 Mars. Le Japon depuis l'abolition du Taicounat, les réformes et les progrès des Européens. *M. A. Vambery*.—Les Russes dans L'Asie Centrale.

15 Juillet. *M. F. Papillon*.—Les nouvelles matières explosives d'après les plus récents Travaux. La Guerre de Sumatra.

Revue Archéologique, 1873, Jan.—Juillet. Nos. 1—7.

No. 2. *M. F. Lenormant*.—La plus ancienne inscription en langue Assyrienne.

No. 5. *M. G. Maspero*.—Sur la Stèle le l'intronisation trouvée au Djebel-Barkal.

Revue et Magasin de Zoologie, 1873, Nos. 1—8.

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Mai. *M. Chevreul*.—La vérité sur l'invention de la photographie.

Juin. *M. C. Deferreury*.—Mémoires de Baber.

Comptes Rendus, Tome 76, Nos. 1—16, Tome 77, Nos. 1—4.

No. 2. *M. Pirot*.—Sur les propriétés antifermentescibles du silicate de soude.

No. 3. *M. O. Tamin -Despualles*.—Rapport entre les observations ozonométriques et la mortalité.

No. 5. *M. Becquerel*.—Mémoires sur les piles électro-capillaires à courant constant. *P. Secchi*.—Sur les protuberances et les taches solaires.

No. 6. *M. Th. du Moncel*.—Note sur les conditions de maximum de la résistance des galvanomètres. *MM. A. Laussedat et A. Mangin*.—Sur l'emploi du Baromètre anéroïde de poche et d'une nouvelle formule hypsométrique d'une grande simplicité. *M. Faye*.—Explication des taches solaires.

No. 8. *M. Dumas*.—Rapport verbal sur un ouvrage de *M. Fayer* intitulé "Histoire des Serpents venimeux de l'Inde ou *The Thanotophadus of India*".—*M. J. Raulin*.—Sur la maladie des vers à soie. *MM. L. Troost et P. Hautefeuille*.—Recherches sur la dissolution des gaz dans la fonte, l'acier et le fer. (Continued in No. 9)

No. 10. *M. A. Béchamp*.—Sur les microzymas normaux du lait, comme cause de la coagulation spontanée, et de la fermentation alcoolique et acétique de ce liquide.

No. 11. *M. Janssen*.—Passage de Vénus; méthode pour obtenir photographiquement l'instant des contacts, avec les circonstances physiques qu'ils présentent.

No. 13. *M. J. Jamain*.—Sur la théorie de l'aimant normal et sur le moyen d'augmenter indéfiniment la force des aimants. *M. A. Béchamp*.—Sur l'alcool et l'acide lactique normaux du lait, comme produits de la fonction des microzymas.

No. 14. *M. Becquerel*.—Mémoires sur les piles et actions électro-capillaires.

No. 15. *M. Chasles*.—Explication du texte d'Aboul Wefa sur la troisième intégralité de la Lune. *M. Th. du Moncel*.—Note sur les effets produits par les courants sur le mercure immergé dans différentes solutions. *P. Secchi*.—Notices sur le climat de la Chine.

No. 18. *M. Th. du Moncel*.—3e Note sur les effets produits par les courants électriques sur le mercure immergé dans différentes solutions. *MM. A. Béchamp et A. Estor*.—États pour servir à l'histoire des microzymas et des bactéries. Transformation physiologique des bactéries en microzymas, et des microzymas en bactéries, dans le tube digestif du même animal.

No. 20. *M. Tresca*.—Note sur les propriétés mécaniques de différents bronzes.

No. 22. *M. Puisseur*.—Note sur le passage de Vénus devant le soleil en 1882. *P. Secchi*.—Essai pendant une éclipse solaire de la nouvelle méthode spectroscopique proposé pour le prochain passage de Vénus.

No. 24. *M. E. Peligot*.—Sur les alliages employés pour la fabrication des monnaies d'or.

No. 25. *P. Secchi*.—Nouvelle série d'observations sur les protubérances solaires; remarques sur les relations qui existent entre les protubérances et les taches.

No. 26. *M. Tacchini*.—Nouvelles observations constatant la présence du magnésium sur le bord entier du Soleil.

Tom. 7. No 1. *M. P. Boulland*.—Nouvelles recherches cliniques sur la localisation dans les lobes cérébraux antérieurs de l'action par laquelle le cerveau concourt à la faculté psycho-physiologique de la parole. *M. Berthelot*.—Sur la chaleur de combinaison rapportée à l'état solide; nouvelle expression thermique des réactions. *M. E. Vieaire*.—Sur la constitution du Soleil et la théorie des taches. *M. H. Tarry*.—Les Cyclones du Soleil comparés à ceux de notre atmosphère. *M. E. Delporte*.—Découverte des makis et du cheval, à l'état fossiles dans les phosphorites du Lot.

No. 2. *M. Becquerel*.—Sur le mode d'intervention de l'eau dans les actions chimiques pendant le mélange des solutions salines neutres, acides et alcalines. *M. Th. du Moncel*.—Note sur le magnétisme. *M. M. Raou et Sarrau*.—Sur la chaleur de combustion des matières explosives.

No. 3. *P. Secchi*.—Sur les spectres du fer et de quelques autres métaux, dans l'arc voltaïque. *M. Tacchini*.—Nouvelles observations spectrales, en désaccord avec quelques-unes des théories émises sur les taches solaires. *M. Th. Schloessing*.—Étude de la nitrification dans les sols. *M. Jacquemin*.—L'acide pyrogallique en présence de l'acide iodique.

No. 4. *M. C. Sédillot*.—De la galvanocaustie thermique ou électro-thermie, appliquée aux opérations chirurgicales. *P. Secchi*.—Nouvelles recherches sur le diamètre solaire. *M. C. Flammarion*.—Sur la planète Mars.

The American Journal of Science and Arts, Vol. V, Nos 25—31.
January—July, 1873.

No. 25. *J. W. Draper*.—Researches in actino-chemistry. On the distribution of Chemical Force in the Spectrum. (Concluded in No. 26).

No. 26. *O. C. Marsh*.—On the gigantic fossil Mammals of the Order Dinocerata.

No. 27. *O. N. Root*.—Observations on the duration and multiple character of Flashes of Lightning. *A. M. Mayer*.—On the effects of Magnetization in changing the dimensions of Iron, Steel and Bismuth bars. (Part I).

No. 28. *A. M. Mayer*.—On a simple device for projecting on a screen the deflections of the needles of a Galvanometer. *O. C. Marsh*.—Additional observations on the Dinocerata.

No. 29. *J. D. Dana*.—On the Origin of Mountains. *C. S. Hastings*.—Comparison of the Spectra of the Limb and of the centre of the Sun, made at the Sheffield Scientific School. *J. Trowbridge*.—Induced currents and derived circuits. *F. H. Bigelow*.—On a method of measuring induced currents. *N. D. C. Hodges*. On methods of determining the resistance of a battery, deduced from Poggendorf's mode of measuring Electromotive Forces.

No. 30. *J. D. Dana*.—On some results of the Earth's contraction from cooling, including the origin of Mountains and the nature of the Earth's interior. (Continued in No. 31.) *C. A.*

Young.—Note on the use of a diffraction "grating" as a substitute for the train of prisms in a Solar Spectroscope.

No. 31. *O. N. Rood*.—A convenient Eye-piece Micrometer for the Spectroscope.

Hewitson's Exotic Butterflies, Nos. 85 and 86.

Dr. Pott's Etymologische Forschungen, Band 4.

Huxley's Critiques and Addresses.

I. Administrative Nihilism. II. The School Boards. III. On Medical Education. IV. Yeast. V. On the formation of Coal. VI. On Coral and Coral Reefs. VII. On the methods and Results of Ethnology. VIII. On some fixed points in British Ethnology. IX. Palæontology and the Doctrine of Evolution. X. Biogenesis and Abiogenesis. XI. Mr. Darwin's Critics. XII. The Geneology of Animals. XIII. Bishop Berkeley on the Metaphysics of Sensation.

Max Müller's Introduction to the Science of Religion.

Exchange.

The Athenæum, July, 1873.

Nature, Nos. 197—204.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max. °	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.576	29.666	29.523	0.143	81.8	86.0	80.0	6.0
2	.641	.646	.583	.103	82.5	89.5	79.0	10.5
3	.617	.672	.540	.132	83.6	89.5	78.6	10.9
4	.551	.607	.468	.139	84.5	92.0	80.5	11.5
5	.521	.565	.457	.108	82.3	85.5	80.0	5.5
6	.560	.647	.503	.144	81.2	84.2	79.5	4.7
7	.625	.689	.576	.113	81.3	83.5	80.0	3.5
8	.690	.743	.646	.097	82.7	86.8	79.5	7.3
9	.714	.755	.663	.092	83.3	86.3	82.0	4.3
10	.705	.779	.646	.133	80.9	85.2	77.4	5.8
11	.713	.774	.666	.108	80.2	83.9	76.6	7.3
12	.756	.798	.717	.081	79.5	83.4	77.0	6.4
13	.717	.763	.655	.108	80.2	83.9	77.2	6.7
14	.667	.728	.609	.119	82.1	88.0	78.6	9.4
15	.657	.709	.589	.120	83.3	89.5	79.0	10.5
16	.662	.719	.607	.112	84.2	90.8	80.8	10.0
17	.679	.720	.625	.095	84.9	89.5	82.0	7.5
18	.678	.729	.627	.102	83.3	90.0	79.5	10.5
19	.676	.735	.592	.143	84.0	90.5	79.0	11.5
20	.654	.724	.585	.139	83.9	90.7	80.0	10.7
21	.678	.737	.604	.133	86.5	92.3	82.5	9.8
22	.681	.734	.599	.135	86.0	91.5	83.0	8.5
23	.666	.725	.610	.115	83.8	88.3	81.4	6.9
24	.642	.695	.566	.129	85.3	90.0	81.5	8.5
25	.629	.689	.561	.128	86.1	92.3	82.2	10.1
26	.690	.710	.566	.164	85.5	90.0	82.5	7.5
27	.606	.655	.542	.113	85.7	91.8	81.5	10.3
28	.545	.604	.468	.136	83.2	89.0	80.0	9.0
29	.489	.533	.426	.107	82.7	88.5	79.5	9.0
30	.537	.600	.484	.116	83.0	87.6	80.2	7.4
31	.570	.618	.507	.111	84.3	90.5	81.0	9.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.9	1.9	78.6	3.2	0.958	10.32	1.08	0.91
2	80.3	2.2	78.8	3.7	.964	.36	.28	.89
3	80.5	3.1	78.3	5.3	.949	.18	.85	.85
4	81.0	3.5	78.5	6.0	.955	.23	2.12	.83
5	80.1	2.2	78.6	3.7	.958	.30	1.28	.89
6	79.6	1.6	78.5	2.7	.955	.29	0.92	.92
7	79.6	1.7	78.4	2.9	.952	.25	.99	.91
8	80.0	2.7	78.1	4.6	.943	.12	1.60	.86
9	81.1	2.2	79.6	3.7	.989	.60	.33	.89
10	78.9	2.0	77.5	3.4	.925	9.98	.12	.90
11	79.0	1.2	78.2	2.0	.946	10.21	0.67	.94
12	78.2	1.3	77.3	2.2	.919	9.94	.72	.93
13	78.9	1.3	78.0	2.2	.940	10.15	.73	.93
14	79.7	2.4	78.0	4.1	.940	.11	1.40	.88
15	80.2	3.1	78.0	5.3	.940	.09	.84	.85
16	80.5	3.7	77.9	6.3	.937	.04	2.20	.82
17	81.6	3.3	79.3	5.6	.979	.46	.03	.84
18	80.2	3.1	78.0	5.3	.940	.09	1.84	.85
19	80.6	3.4	78.2	5.8	.946	.13	2.04	.83
20	81.3	2.6	79.5	4.4	.986	.57	1.56	.87
21	82.9	3.6	80.7	5.8	1.024	.91	2.19	.83
22	82.1	3.9	79.4	6.6	0.983	.47	.44	.81
23	81.0	2.8	79.0	4.8	.970	.40	1.70	.86
24	81.6	3.7	79.0	6.3	.970	.37	2.27	.82
25	81.9	4.2	79.0	7.1	.970	.35	.60	.80
26	81.9	3.6	79.4	6.1	.983	.49	.23	.83
27	81.9	3.8	79.2	6.5	.976	.41	.39	.81
28	80.7	2.5	78.9	4.3	.967	.39	1.50	.87
29	80.6	2.1	79.1	3.6	.973	.45	.27	.89
30	81.2	1.8	79.9	3.1	.998	.72	.10	.91
31	81.8	2.5	80.0	4.3	1.001	.72	.56	.87

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height the Baromet 32° Fahr	Range of the Barometer for each hour during the month.				Mean Dry B Thermomete	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.			Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o	
Mid- night.	29.654	29.767	29.514	0.253	81.4	85.0	77.6	7.4	
1	.644	.746	.507	.239	81.2	85.0	77.3	7.7	
2	.633	.735	.502	.233	80.9	83.5	77.2	6.3	
3	.622	.725	.483	.242	80.8	83.3	77.2	6.1	
4	.615	.717	.472	.245	80.7	83.5	77.2	6.3	
5	.627	.751	.482	.269	80.6	83.0	77.0	6.0	
6	.641	.766	.498	.268	80.6	83.0	77.2	5.8	
7	.657	.780	.513	.267	81.0	83.5	77.5	6.0	
8	.670	.782	.525	.257	82.3	85.0	77.8	7.2	
9	.681	.788	.533	.255	83.5	87.0	77.4	9.6	
10	.683	.798	.533	.265	84.8	89.0	78.0	11.0	
11	.676	.798	.518	.280	85.8	90.5	79.4	11.1	
Noon.	.661	.790	.508	.282	86.2	91.0	78.5	12.5	
1	.639	.761	.476	.285	86.8	92.0	78.5	13.5	
2	.613	.745	.455	.290	86.8	92.3	79.0	13.3	
3	.594	.736	.432	.304	86.8	92.0	79.3	12.7	
4	.580	.721	.426	.295	86.6	92.3	79.7	12.6	
5	.578	.726	.431	.295	85.3	91.3	80.0	11.3	
6	.588	.734	.438	.296	84.2	88.5	78.2	10.3	
7	.607	.744	.455	.289	83.3	86.6	78.0	8.6	
8	.630	.748	.480	.268	82.9	86.0	78.6	7.4	
9	.651	.760	.502	.258	82.4	85.8	76.6	9.2	
10	.667	.767	.516	.251	82.0	85.7	76.8	8.9	
11	.665	.774	.519	.255	81.7	85.0	77.8	7.2	

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	M. El	Mean Weight in a Cubic ft of a	Additional Weig Vapour requirec complete saturat	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. °r.	T. gr.	
Mid- night.	79.8	1.6	78.7	2.7	0.961	10.35	0.92	0.92
1	79.7	1.5	78.6	2.6	.958	.32	.89	.92
2	79.6	1.3	78.7	2.2	.961	.37	.73	.93
3	79.5	1.3	78.6	2.2	.958	.34	.73	.93
4	79.5	1.2	78.7	2.0	.961	.37	.67	.94
5	79.5	1.1	78.7	1.9	.961	.37	.64	.94
6	79.5	1.1	78.7	1.9	.961	.37	.64	.94
7	79.8	1.2	79.0	2.0	.970	.46	.68	.94
8	80.4	1.9	79.1	3.2	.973	.47	1.11	.90
9	80.6	2.9	78.6	4.9	.958	.28	.72	.86
10	81.2	3.6	78.7	6.1	.961	.29	2.17	.83
11	81.3	4.5	78.1	7.7	.943	.06	.77	.78
Mon.	81.6	4.6	78.4	7.8	.952	.15	.84	.78
1	81.9	4.9	79.0	7.8	.970	.33	.88	.78
2	82.1	4.7	79.3	7.5	.979	.42	.79	.79
3	82.1	4.7	79.3	7.5	.979	.42	.79	.79
4	81.7	4.9	78.8	7.8	.964	.27	.87	.78
5	81.5	3.8	78.8	6.5	.964	.29	.35	.81
6	81.1	3.1	78.9	5.3	.967	.37	1.87	.85
7	80.8	2.5	79.0	4.3	.970	.42	.51	.87
8	80.7	2.2	79.2	3.7	.976	.48	.31	.89
9	80.4	2.0	79.0	3.4	.970	.44	.17	.90
10	80.2	1.8	78.9	3.1	.967	.41	.08	.91
11	80.0	1.7	78.8	2.9	.964	.38	0.99	.91

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations.
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

Solar Radiation, Weather, &c.

o	Rain Gauge 1½ ft. above Ground. Inches	WIND.			General aspect of the Sky.
		Prevailing direction.	Ma. Press. lb	Daily Velocity. Miles	
139.0	0.74	SSW, SE & SSE	1.2	77.4	O to 10 A. M. S to 11 P. M. Slight R at after intervals.
139.8	0.08	SE & ESE		178.9	O to 5 P. M., \i to 9 A. M. \i to 1 P. M., O to 5 P. M., \i to 9 P. M., B to 11 P. M. T between 2 & 3 P. M. Light R at 12½ A. M. 1½, 2½ & 3½ P. M.
145.0	0.13	SSE & SE		97.0	B to 2 A. M. \i to 4 A. M., \i to 7 A. M. \i to 5 P. M., \i to 11 P. M. T at 4½ & 5½ P. M. L between 7 & 8 P. M. Slight R at 4½ A. M. 3 & 4 P. M.
141.0	0.07	SSE, SE & E by S	0.8	72.4	\i to 2 A. M., \i to 6 A. M. i to 11 P. M. T at 4½ P. M. Light R at 3½ & 4½ P. M.
*139.0	0.11	SE & E	0.6	154.8	S to 8 A. M., \i to 11 P. M. Light R after intervals, after 9 A. M.
	0.34	SE & S	1.9	230.5	O to 4 P. M. S to 8 P. M., \i to 11 P. M. Slight R at after in- tervals from 2 A. M. to 1½ P. M.
	0.05	S & SSE		170.0	\i to 5 A. M. O to 4 P. M., \i to 11 P. M. Light R at 5½, 6½, 10 & 11 A. M.
8 129.0	...	SSE & SSW		122.0	S to 6 P. M., \i to 11 P. M. D at 8 A. M.
9 125.5	...	SSW & S		191.1	O. D at 1, 8, 11½ A. M. & 6 P. M.
10	0.32	S & SSW		177.2	O to 6 P. M. S. to 11 P. M. L. from 8 to 10 P. M. Slight R from 6½ to 12 A. M.
11	1.12	SSW & S		107.1	O to 4 P. M. S to 7 P. M. O to 11 P. M. T at 11½ A. M. & 8 P. M. L at 8 P. M. R from 10½ A. M. to 4 & 8 to 11 P. M.
12	*1.61	SW & SSW	0.8	91.2	O. Slight R from midnight to 7, 11 A. M. to 2 & at 6 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, ~i Cumulo-strati, \i Nimib,
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Feel since 8 P. M., of the 11th

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1/2 ft. above Ground.	Prevailing direction.	Max. temp.	Daily mean.	General aspect of the Sky.
	°	Inches		°	Mil.	
13	...	1.27	S S W & S by W	...	83.2	O to 5 P. M. clouds of different kinds to 11 P. M. R from 3 1/2 to 8 A. M. D from 9 A. M. to 4 P. M. & at 10 1/2 P. M.
14	140.0	0.70	W N W, S W & S	...	41.5	O to 5 A. M., 11 to 8 A. M. O to 10 A. M. 11 to 7 P. M., 11 to 11 P. M., Slight R at 10 A. M. 5 1/2, 6 1/2, 8 & 11 P. M.
15	142.5	0.11	S by E & W S W	...	...	O to 3 A. M., 11 to 1 P. M. 11 to 4 P. M. O to 11 P. M. L at 11 P. M. Light R between midnight & 1 at 1 1/2, 2 1/2 A. M., 7 & 10 P. M.
16	145.0	0.07	W S W & S W	...	...	Clouds of different kinds. L at midnight, 7 & 8 P. M. Slight R at 5 1/2 A. M., & 10 P. M.
17	149.0	...	W S W & S S W	...	...	O to 6 A. M., 11 to 4 P. M. O to 8 P. M. S to 11 P. M. T at 6 P. M. L at 7 P. M.
18	142.0	0.10	S S W & S W	...	...	O to 8 A. M., 11 to 7 P. M. S to 11 P. M. T between 4 & 5 P. M. L at 10 & 11 P. M. Light R at 1, 2, 3, 7 A. M. 4, 5, 6 & 8 1/2 P. M.
19	144.0	0.93	S S W & S by W	...	...	11 to 2 A. M., 11 to 9 A. M., 11 to 3 P. M. O to 11 P. M. L at midnight & 1 A. M., & from 7 to 10 P. M. T & R from 6 1/2 to 11 P. M.
20	146.0	0.37	S E & S	0.8	...	S to 5 A. M., 11 to 9 A. M., 11 to 2 P. M. O to 7 P. M. B to 11 P. M. L at midnight. T & R between 3 & 4 P. M.
21	140.5	...	S by W & S S E	...	...	S to 6 A. M., 11 to 7 P. M. S to 11 P. M. L on S from 7 to 10 P. M.
22	145.2	...	S by E & S by W	...	...	S to 1 A. M. B to 5 A. M., 11 to 7 P. M. B to 11 P. M.

11 Cirri,—1 Strati, 11 Cumuli, 11 Cirro-strati, 11 Cumulo-strati, 11 Nimbi,
11 Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
23	134.5	0.04	S by E & E S E	...	109.0	B to 2 A. M., \i to 7 A. M., \i to 2 P. M. O to 4 P. M. S to 11 P. M. T at 2½ P. M. Light R at 12½ A. M. 3 & 4½ P. M.
24	140.0	...	E S E & N E	...	70.0	\i to 6 A. M., \i & \i to 12 A. M. S to 2 P. M., \i to 6 P. M. \i to 11 P. M. L from 7 to 11 P. M.
25	142.0	0.14	E S E & S W	..	104.4	\i to 1 A. M. B to 5 A. M., \i to 8 A. M., \i to 7 P. M., \i to 11 P. M. L at midnight & 1 A. M. Slight R at 5 & 7½ P. M.
26	146.0	0.04	S W & E by S	...	86.3	B to 4 A. M. S to 10 A. M., \i to 7 P. M. B to 11 P. M. Light R at 1½ & 2½ P. M.
27	141.5	...	S E, E & S by E	...	117.4	B to 3 A. M., \i to 6 A. M. S to 9 A. M., \i to 8 P. M. B to 11 P. M. L on W at 7½ P. M. T & D between 5 & 6 P. M.
28	133.2	0.31	E by S & E	1.3	172.9	Chiefly S. Slight R from 1½ to 3, at 6 & 9½ P. M.
29	132.0	0.70	E & S E	5.6	222.6	Chiefly O. Brisk wind from 2½ to 6 P. M. T between 11 & 12 A. M. L on W at 11 P. M. Slight R after intervals.
30	133.3	0.40	S W & S S W	...	240.2	O to 2 P. M., \i to 9 P. M., B to 11 P. M., L from midnight to 4 A. M. Slight R at 1½, 3½, 4½, 9 A. M., 1 & 4½ P. M.
31	143.0	0.48	S S W & S S E	1.2	107.6	B to 3 A. M. S to 5 A. M., \i to 9 A. M., \i to 1 P. M. O to 5 P. M., \i to 9 P. M., \i to 11 P. M. T at 1 P. M. L from midnight to 2 A. M. & at 11½ P. M. R between 1 & 2 & 5 & 6 P. M.

\i Cirri — \i Strati. \i Cumuli. \i Cirro-strati. \i Cumulo-strati. \i Nimbi, \i Cirro-Cumuli. B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.637
Max. height of the Barometer occurred at 10 and 11 A.M. on the 12th...	29.798
Min. height of the Barometer occurred at 4 P. M. on the 29th ...	29.426
Extreme range of the Barometer during the month	0.372
Mean of the daily Max. Pressures	29.694
Ditto ditto Min. ditto	29.574
Mean daily range of the Barometer during the month	0.120

	°
Mean Dry Bulb Thermometer for the month	83.3
Max. Temperature occurred at 2 & 4 P. M. on the 21st and 25th ...	92.3
Min. Temperature occurred at 9 P. M. on the 11th	76.6
Extreme range of the Temperature during the month	15.7
Mean of the daily Max. Temperature	88.3
Ditto ditto Min. ditto,	80.0
Mean daily range of the Temperature during the month	8.3

Mean Wet Bulb Thermometer for the month	80.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.7
Computed Mean Dew-point for the month	78.7
Mean Dry Bulb Thermometer above computed mean Dew-point	4.6

	Inches.
Mean Elastic force of Vapour for the month	0.961

	Troy grain.
Mean Weight of Vapour for the month	10.31
Additional Weight of Vapour required for complete saturation ...	1.62
Mean degree of humidity for the month, complete saturation being unity	0.86

	°
Mean Max. Solar radiation Thermometer for the month	139.9

	Inches.
Rained 27 days,—Max. fall of rain during 24 hours	1.27
Total amount of rain during the month	10.23
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	9.84.
Prevailing direction of the Wind	S. S. W & S. E.

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of August 1873.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1873.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.564	29.613	29.507	0.106	83.9	89.3	81.0	8.3
2	.589	.612	.529	.113	83.0	89.0	80.0	9.0
3	.567	.629	.482	.147	81.0	89.5	79.5	10.0
4	.504	.550	.429	.121	83.1	88.0	80.0	8.0
5	.517	.580	.416	.134	82.7	89.0	80.0	9.0
6	.581	.652	.527	.125	78.6	80.5	76.5	4.0
7	.660	.711	.612	.099	82.0	86.8	78.0	8.8
8	.698	.740	.619	.091	85.0	90.0	80.5	9.5
9	.691	.741	.631	.110	86.0	90.0	82.2	7.8
10	.646	.696	.557	.139	85.0	91.0	80.5	10.5
11	.627	.684	.519	.135	84.6	91.2	82.0	9.2
12	.554	.627	.469	.158	82.1	86.5	80.0	6.5
13	.599	.666	.525	.141	81.7	87.8	79.0	8.8
14	.658	.703	.605	.098	81.3	86.2	79.5	6.7
15	.729	.795	.662	.133	83.5	89.5	79.3	10.2
16	.782	.850	.709	.141	84.9	90.5	80.0	10.5
17	.802	.872	.742	.130	84.0	87.6	82.0	5.6
18	.783	.856	.721	.135	84.6	89.5	80.3	9.2
19	.750	.808	.680	.128	84.8	89.8	81.0	8.8
20	.708	.769	.643	.126	85.0	91.0	81.5	9.5
21	.666	.716	.610	.106	86.1	90.8	82.4	8.4
22	.639	.690	.588	.102	86.6	92.0	82.0	10.0
23	.644	.689	.595	.094	86.8	92.5	82.5	10.0
24	.682	.732	.636	.096	87.0	93.0	82.5	10.5
25	.707	.762	.658	.104	83.7	87.5	81.5	6.0
26	.718	.772	.665	.107	85.8	92.0	81.0	11.0
27	.727	.792	.668	.124	86.6	92.8	82.2	10.6
28	.711	.765	.647	.108	86.5	92.5	82.5	10.0
29	.739	.816	.683	.133	86.6	93.6	81.5	12.1
30	.791	.859	.736	.123	84.6	91.5	81.0	10.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches	T. gr.	T. gr.	
1	81.1	2.5	79.6	4.3	0.989	10.60	1.53	0.87
2	80.6	2.4	78.9	4.1	.967	.39	.13	.82
3	81.1	2.9	79.1	1.9	.973	.12	.75	.86
4	81.3	2.1	79.8	3.6	.995	.66	.30	.89
5	80.5	2.2	79.0	3.7	.970	.12	.30	.89
6	77.7	0.9	77.1	1.5	.913	9.88	0.50	.95
7	79.6	2.4	77.9	4.1	.937	10.08	1.39	.88
8	81.0	4.0	78.2	6.8	.946	.11	2.12	.81
9	81.7	4.3	78.7	7.3	.961	.26	.65	.80
10	81.7	3.3	79.4	5.6	.983	.49	.04	.81
11	81.9	2.7	80.0	4.6	1.001	.70	1.69	.86
12	80.1	2.0	78.7	3.4	0.961	.35	.16	.90
13	79.6	2.1	78.1	3.6	.913	.11	.23	.89
14	79.6	1.7	78.4	2.9	.952	.25	0.99	.91
15	81.1	2.4	79.4	4.1	.983	.54	1.46	.88
16	81.8	3.1	79.6	5.3	.989	.58	.91	.85
17	81.4	2.6	79.6	4.4	.989	.60	.57	.87
18	81.0	3.6	78.5	6.1	.955	.23	2.16	.83
19	81.3	3.5	78.8	6.0	.961	.31	.15	.83
20	81.5	3.5	79.0	6.0	.970	.37	.16	.83
21	81.8	4.3	78.8	7.3	.961	.29	.66	.80
22	81.1	5.5	77.8	8.8	.934	9.95	3.19	.76
23	81.9	4.9	79.0	7.8	.970	10.33	2.88	.78
24	81.4	5.6	78.0	9.0	.910	.01	3.28	.75
25	80.7	3.0	78.6	5.1	.958	.28	1.79	.85
26	80.9	4.9	77.5	8.3	.925	9.88	2.95	.77
27	81.6	5.0	78.6	8.0	.958	10.21	.93	.78
28	81.1	5.4	77.9	8.6	.937	9.98	3.12	.76
29	80.6	6.0	77.0	9.6	.910	.69	.45	.74
30	80.0	4.6	76.8	7.8	.905	.67	2.72	.78

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1878.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches	Inches.	Inches	o	o	o	o
Mid- night	29.679	29.819	29.529	0.290	82.1	85.0	79.0	6.0
1	.668	.807	.519	.288	82.0	81.7	78.6	6.1
2	.659	.797	.510	.287	81.7	81.5	78.2	6.3
3	.650	.790	.503	.287	81.5	81.2	77.5	6.7
4	.645	.782	.499	.292	81.3	81.0	77.5	6.5
5	.658	.788	.498	.290	81.2	83.7	77.5	6.2
6	.671	.800	.511	.289	81.1	83.1	76.5	6.9
7	.687	.839	.518	.312	81.6	81.0	77.2	6.8
8	.708	.858	.525	.333	83.3	85.7	77.5	8.2
9	.720	.872	.550	.322	85.1	87.7	78.0	9.7
10	.719	.861	.541	.323	86.5	89.5	78.0	11.5
11	.707	.852	.529	.323	87.5	91.2	78.5	12.7
Noon	.689	.825	.513	.312	88.2	92.1	78.0	14.1
1	.662	.787	.489	.298	88.7	92.5	77.5	15.0
2	.637	.771	.460	.311	88.7	93.6	77.7	15.9
3	.618	.753	.429	.324	87.6	93.0	78.1	14.6
4	.611	.748	.410	.308	87.3	92.5	79.5	13.0
5	.611	.745	.439	.307	86.5	91.8	79.3	12.5
6	.625	.751	.462	.292	85.2	89.0	79.5	9.5
7	.617	.779	.486	.293	81.3	87.8	80.2	7.6
8	.671	.799	.511	.288	83.7	86.6	80.2	6.4
9	.689	.821	.538	.286	83.3	86.5	80.0	6.5
10	.699	.835	.540	.295	82.8	86.0	80.0	6.0
11	.694	.839	.536	.303	82.6	85.5	79.0	6.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above	Computed Dew Point.	Wet Bulb Point.	Mean El- Vapour	Vapour of air. Mean Weig- in a Cubic	Ad- diti- onal Weight of Vapour required for complete saturation.	Mo- dity, computed as being unity
					Inches.	T. gr.	T. gr.	
Mid- night	80.7	1.7	79.5	2.9	0.986	10.60	1.01	0.91
1	80.5	1.5	79.4	2.6	.983	.56	0.91	.92
2	80.4	1.3	79.5	2.2	.986	.62	.75	.93
3	80.2	1.3	79.3	2.2	.979	.55	.76	.93
4	80.1	1.2	79.3	2.0	.979	.55	.69	.94
5	80.0	1.2	79.2	2.0	.976		.69	.94
6	79.9	1.2	79.1	2.0	.973	.49	.68	.94
7	80.2	1.4	79.2	2.4	.976	.52	.82	.93
8	80.5	2.8	78.5	4.8	.955	.25	1.68	.86
9	81.0	4.1	78.1	7.0	.943	.08	2.19	.80
10	81.5	5.0	78.5	8.0	.955	.18	.92	.78
11	81.6	5.9	78.1	9.4	.943	.04	3.45	.74
Noon.	81.8	6.4	78.0	10.2	.940	9.99	.77	.73
1	81.7	7.0	77.5	11.2	.925	.82	4.14	.70
2	81.9	6.8	77.8	10.9	.934	.91	.05	.71
3	81.4	6.2	77.7	9.9	.931	.90	3.62	.73
4	81.4	5.9	77.9	9.4	.937	.98	.43	.74
5	81.3	5.2	78.2	8.3	.946	10.09	.01	.77
6	81.1	4.1	78.2	7.0	.946	.11	2.60	.80
7	81.2	3.1	79.0	5.3	.970	.40	1.88	.85
8	80.9	2.8	78.9	4.8	.967	.37	.70	.86
9	80.8	2.5	79.0	4.3	.970	.42	.51	.87
10	80.6	2.2	79.1	3.7	.973	.45	.30	.89
11	80.6	2.0	79.2	3.4	.976	.50	.18	.90

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1873.*

Solar Radiation, Weather, &c.

WIND.						
Date	Max. Sol radiation	Rain (Gua 1½ ft. abo Ground	Prevailing direction.	Max. pressure	Daily velocity.	General aspect of the Sky.
	°	Inches		lb.	Miles	
1	136.0	0.09	SS E & E S E	1.0	138.4	∩ i to 8 A. M. ∩ i to 12 A. M. S to 5 P. M. ∩ i to 11 P. M. L on S W at Midnight, Slight R at 1½ & 4 P. M.
2	133.8	0.10	E S E & S E	1.6	188.2	Clouds of different kinds, Light R after intervals.
3	143.0	...	E S E & S E	...	182.0	∩ i to 1 A. M S to 5 A. M. ∩ i to 8 A. M. ∩ i to 6 P. M. ∩ i to 11 P. M. D at 12½ A. M. 3½ & 11½ P. M.
4	123.0	0.11	S E & S	...	196.3	Scuds to 8 A. M. ∩ i to 7 P. M. ∩ i to 11 P. M. T at 1½ & 3 P. M. Slight R at 1½ A. M. 1½, 3, 5 & 7 P. M.
5	129.0	0.70	S & E S E	0.8	190.7	∩ i to 7 A. M. ∩ i to 1 P. M. O to 5 P. M. ∩ i to 9 P. M. O to 11 P. M. T between 2 & 3 P. M. R from 2½ to 3½ at 5 & 11 P. M.
6	...	2.32	S S W & S by W	1.8	182.7	O. R nearly the whole day.
7	134.0	0.19	S by W & S W	...	178.0	O to 9 A. M. ∩ i to 6 P. M. B to 11 P. M. T from 1 to 3 A. M. Slight R from Midnight to 3 at 7½ & 9 A. M.
8	139.0	...	S W & W by S	...	133.8	∩ i to 2 A. M. ∩ i to 6 A. M. B to 8 A. M. ∩ i to 3 P. M. ∩ i to 11 P. M.
9	137.8	...	W by S & W by N	...	98.8	∩ i to 12 A. M. ∩ i to 6 P. M. B to 8 A. M. ∩ i to 11 P. M. L on N E at 6½ P. M.
10	136.5	0.29	W by N & E by S	1.0	106.2	∩ i & ∩ i to 8 A. M. ∩ i to 3 P. M. O to 11 P. M. T at 2½ & 4 P. M. L on S between 8 & 9 P. M. Slight R at 2½, 4½, 6½, 9 & 10 P. M.
11	133.7	0.29	E by S & N		109.9	O to 1 A. M. ∩ i to 9 A. M. ∩ i to 2 P. M. O to 5 P. M. S to 8 P. M. ∩ i to 11 P. M. T at 3 P. M. Lat 7.8 & 11 P. M. R at 3 & 4 P. M.

∩ i Cirri,—i Strati, ∩ i Cumuli, ∩ i Cirro-strati, ∩ i Cumulo-strati, ∩ i Nimbi,
∩ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	W ^h P ^{res} lb	Day V ^{el} oc ^{ity} Mile.	
12	131.0	0.72	E	2.4	115.3	S to 2 A. M. \searrow i to 6 A. M. O to 7 P. M. S to 11 P. M. L from Midnight to 2 A. M. & at 8 P. M. R at 5½, 11½ & from 12½ A. M. to 2 P. M.
13	136.0	0.75	E S E, S E & S S E	2.0	238.0	Chiefly O. T between 2 & 3 P. M. R from Midnight to 3 at 8½, 9½, 11 A. M. & 2½ P. M.
14	120.0	0.13	S E & S by E		185.7	S to 1 A. M. \searrow i to 4 A. M. S to 7 A. M. \searrow i to 1 P. M. O to 8 P. M. \searrow i to 11 P. M. T at 11 A. M. L on S W at 4 A. M. Light R at 8½, 10½, 12 A. M. & 5 P. M.
15	112.0	0.07	S by E, S S E & S S W		119.8	\searrow i to 8 A. M. \searrow i to 7 P. M. B to 11 P. M. Light R at 1½, 5, 5½ & 6½ P. M.
16	147.0	0.06	S S W		98.5	B to 2 A. M. \searrow i to 9 A. M. \searrow i to 6 P. M. O to 11 P. M. T at 9 & 10 P. M. L from 7 to 10 P. M. Light R at 5½, 9 & 11 P. M.
17	139.5	...	S W, & S by E	...	94.1	O to 1 A. M. \searrow i to 5 A. M. S to 8 A. M. \searrow i to 11 A. M. O to 3 P. M. \searrow i to 7 P. M. B to 11 P. M. D at Midnight.
18	140.2		S by E & S S W		98.4	B to 7 A. M. \searrow i to 5 P. M. \searrow i to 7 P. M. B to 11 P. M. L on N W at Midnight 7 & 8 P. M.
19	143.5		S S W & S W		133.0	B to 5 A. M. \searrow i to 10 A. M. \searrow i to 12 A. M. \searrow i to 6 P. M. B to 11 P. M.
20	143.5		S S W		170.1	B to 8 A. M. \searrow i to 3 P. M. \searrow i to 7 P. M. B to 11 P. M. L on N at 7 & 10 P. M. T & D at 2½ P. M.
21	144.0		S S W & W		150.4	B to 7 A. M. \searrow i to 10 A. M. \searrow i to 1 P. M. S to 5 P. M. \searrow i to 7 P. M. B to 11 P. M. L on N at 11½ P. M.

\searrow i Cirri, — i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati, \searrow i Nimbi, \searrow i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1873.*

Solar Radiation, Weather, &c., .

	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Direction P	Force loc	
	o	Inches				
22	141.8	...	S W & W by N		95.7	B to 12 A. M. ☾ to 5 P. M. B to 11 P. M.
23	143.0		W by N & W		113.3	B to 6 A. M. ☾ to 8 A. M. B to 11 A. M. ☾ to 4 P. M. B to 11 P. M. T at 2½ & 3½ P. M. D at 3½ P. M.
24	139.0		W, N W & S W		99.0	B to 5 P. M. ☾ to 6 P. M. O to 11 P. M. T at 4 P. M.
	131.0		S W & S S W		120.8	S to 8 A. M. ☾ to 1 P. M. S to 5 P. M. ☾ & ☾ to 11 P. M. T at 3½ & 4½ P. M.
	141.5		S S W & S W		139.9	B to 1 A. M. ☾ to 10 A. M. ☾ to 1 P. M. ☾ to 4 P. M. B to 11 P. M. L on N E at 11 P. M.
27	143.0		S W & W		128.6	B to 1 P. M. ☾ to 11 P. M.
28	141.4		S W		135.3	B to 7 A. M. ☾ to 1 P. M. ☾ to 4 P. M. ☾ to 6 P. M. B to 11 P. M. D at 2½ P. M.
29	146.8		S W, E & S by E		104.8	B to 10 A. M. ☾ to 8 P. M. ☾ to 11 P. M. L on N W between 9½ & 10½ P. M. D at 6½ P. M.
	139.0		S by E & E by S		95.8	Clouds of different kinds T at 4½ & 5 P. M. D at 3½ P. M.

☾ i Cirri — i Strati, ☾ i Cumuli, ☾ i Cirro-strati, ~ i Cumulo-strati ☾ i Nimbi,
☾ i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.668
Max. height of the Barometer occurred at 9 A. M. on the 17th ...	29.872
Min. height of the Barometer occurred at 3 P. M. on the 4th ...	29.429
Extreme range of the Barometer during the month ...	0.443
Mean of the daily Max. Pressures	29.726
Ditto ditto Min. ditto	29.605
Mean daily range of the Barometer during the month ...	0.121

	°
Mean Dry Bulb Thermometer for the month	84.3
Max. Temperature occurred at 2 P. M. on the 29th...	93.6
Min. Temperature occurred at 6 P. M. on the 6th ...	76.5
Extreme range of the Temperature during the month ...	17.1
Mean of the daily Max. Temperature	89.7
Ditto ditto Min. ditto,	80.7
Mean daily range of the Temperature during the month ...	9.0

Mean Wet Bulb Thermometer for the month	80.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	3.4
Computed Mean Dew-point for the month	78.5
Mean Dry Bulb Thermometer above computed mean Dew-point ...	5.8

	Inches.
Mean Elastic force of Vapour for the month	0.955

	Troy grain.
Mean Weight of Vapour for the month	10.23
Additional Weight of Vapour required for complete saturation ...	2.05
Mean degree of humidity for the month, complete saturation being unity	0.83

	°
Mean Max. Solar radiation Thermometer for the month	137.3

	Inches.
Rained 21 days,—Max. fall of rain during 24 hours	2.32
Total amount of rain during the month	5.82
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	5.44.
Prevailing direction of the Wind	S. S. W & S. W.

* Height 70 feet 10 inches above ground.

Abstract of the Hourly Meteorological Observations taken at the S G O Calcutta in the month of Sept 1873

MONTHLY REULT-

Tables shewing the number of days on which at a given hour any particular wind blew together with the number of days on which at the same hour when an particular wind was blowing, it rained

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1873.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.				
1	29.799	29.858	29.725	0.133	84.9	91.0	79.5	11.5
2	.788	.855	.724	.131	84.8	91.5	80.0	11.5
3	.777	.842	.701	.141	85.7	93.0	78.5	14.5
4	.773	.827	.713	.114	83.9	89.5	79.2	10.3
5	.788	.854	.739	.115	84.4	91.0	78.0	13.0
6	.832	.907	.782	.125	82.6	89.5	76.8	12.7
7	.843	.915	.778	.137	82.1	88.8	76.0	12.8
8	.814	.908	.792	.116	81.8	88.5	75.5	13.0
9	.877	.950	.825	.125	81.5	87.5	75.0	12.5
10	.891	.963	.827	.136	82.6	89.1	77.0	12.1
11	.882	.950	.818	.132	79.4	86.2	77.0	9.2
12	.784	.851	.703	.148	80.4	87.6	76.0	11.6
13	.771	.835	.712	.123	80.9	88.0	76.5	11.5
14	.839	.903	.799	.104	81.2	88.3	75.8	12.5
15	.824	.888	.754	.134	82.3	89.0	76.5	12.5
16	.812	.880	.770	.110	82.9	90.0	76.8	13.2
17	.840	.907	.794	.113	82.6	90.5	76.5	14.0
18	.840	.905	.781	.124	83.5	90.4	77.0	13.4
19	.813	.864	.749	.115	83.7	90.5	79.5	11.0
20	.838	.904	.775	.129	84.3	91.5	79.0	12.5
21	.857	.915	.806	.109	84.6	90.8	80.7	10.1
22	.864	.931	.813	.118	83.8	89.5	79.4	10.1
23	.874	.941	.825	.116	81.8	87.8	77.6	10.2
24	.862	.932	.810	.122	81.9	88.6	76.5	12.1
25	.871	.919	.827	.092	82.0	88.5	76.8	11.7
26	.850	.919	.797	.122	80.4	86.3	74.0	12.3
27	.821	.881	.764	.117	80.6	87.5	75.2	12.3
28	.827	.884	.781	.103	77.5	85.0	71.2	13.8
29	.848	.902	.809	.093	77.8	87.3	70.5	16.8
30	.870	.961	.819	.142	78.3	88.2	70.0	18.2
31	.857	.923	.799	.124	77.8	87.8	69.3	18.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1878.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon — (Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches	T. gr.	T. gr.	
1	80.0	4.9	76.6	8.3	0.899	9.61	2.88	0.77
2	80.0	4.8	76.6	8.2	.899	.61	.85	.77
3	80.1	5.6	76.2	9.5	.887	.17	3.33	.71
4	79.2	4.7	75.9	8.0	.879	.12	2.71	.74
5	77.3	7.1	72.3	12.1	.783	8.37	3.94	.68
6	71.0	8.6	64.0	11.6	.681	7.30	4.38	.63
7	71.0	8.1	68.3	13.8	.648	.39	.12	.61
8	73.1	8.7	67.0	11.8	.659	.08	.32	.62
9	75.7	5.8	71.6	9.9	.766	8.23	3.08	.73
10	76.7	5.9	72.6	10.0	.790	.19	.19	.73
11	76.6	2.8	74.6	4.8	.813	9.11	1.51	.86
12	77.1	3.3	71.8	5.6	.819	.15	.79	.81
13	77.5	3.4	75.1	5.8	.857	.23	.87	.83
14	76.9	4.3	73.9	7.3	.821	8.88	2.33	.79
15	77.1	5.2	73.5	8.8	.811	.74	.81	.70
16	75.9	7.0	71.0	11.9	.751	.05	3.74	.68
17	76.1	6.5	71.5	11.1	.763	.20	.48	.70
18	76.9	6.6	72.3	11.2	.783	.39	.61	.70
19	78.2	5.5	71.3	9.4	.835	.96	.11	.74
20	76.6	7.7	71.2	13.1	.756	.08	4.20	.66
21	77.7	6.9	72.9	11.7	.797	.52	3.87	.69
22	77.7	6.1	73.4	10.4	.811	.69	.41	.72
23	76.1	5.7	72.1	9.7	.778	.36	.04	.72
24	76.2	5.7	72.2	9.7	.781	.38	.06	.72
25	74.9	7.1	69.9	12.1	.725	7.79	.68	.68
26	72.9	7.5	67.6	12.8	.672	.25	.69	.66
27	72.4	8.2	66.7	13.9	.653	.03	.98	.64
28	70.1	7.4	61.9	12.6	.615	6.67	.37	.66
29	70.1	7.7	64.7	13.1	.611	.62	.51	.66
30	69.6	8.7	63.5	14.8	.588	.35	.93	.62
31	68.0	9.8	61.1	16.7	.543	5.87	4.26	.56

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1878.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.810	29.915	29.767	0.148	78.9	82.0	73.0	9.0
1	.831	.905	.762	.143	78.5	82.0	72.7	9.3
2	.823	.903	.759	.111	78.0	81.8	72.5	9.3
3	.814	.892	.719	.113	77.6	81.7	72.0	9.7
4	.815	.886	.739	.117	77.2	81.5	71.5	10.0
5	.828	.893	.755	.138	76.8	81.2	70.7	10.5
6	.815	.906	.761	.112	76.5	81.0	69.3	11.7
7	.860	.927	.775	.152	77.1	82.0	69.3	12.7
8	.881	.959	.806	.153	79.6	84.7	73.4	11.3
9	.897	.963	.814	.149	82.7	86.6	77.0	9.6
10	.896	.959	.810	.149	84.9	89.5	79.2	10.3
11	.878	.937	.793	.141	86.9	90.0	82.0	8.0
Noon.	.855	.911	.769	.142	87.8	92.0	84.0	8.0
1	.826	.885	.751	.131	88.0	92.5	79.3	13.2
2	.801	.855	.723	.132	88.2	92.5	77.5	15.0
3	.785	.848	.707	.141	88.2	93.0	78.9	14.1
4	.779	.844	.701	.143	87.6	91.6	79.9	11.7
5	.783	.840	.703	.137	86.3	90.5	79.5	11.0
6	.794	.853	.713	.140	84.2	88.8	79.0	9.8
7	.811	.883	.738	.145	82.6	87.5	78.0	9.5
8	.831	.898	.760	.138	81.4	86.0	76.0	10.0
9	.846	.918	.772	.146	80.4	83.7	75.5	8.2
10	.851	.924	.783	.141	79.8	83.5	75.0	8.5
11	.848	.919	.776	.143	79.1	82.6	73.5	9.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	75.6	3.3	73.3	5.6	0.809	8.73	1.74	0.83
1	75.3	3.2	73.1	5.4	.803	.70	.65	.84
2	75.1	2.9	73.1	4.9	.803	.70	.49	.85
3	74.8	2.8	72.8	4.8	.795	.62	.45	.86
4	74.6	2.6	72.8	4.4	.795	.64	.31	.87
5	74.3	2.5	72.5	4.3	.787	.56	.27	.87
6	74.0	2.5	72.2	4.3	.781	.48	.27	.87
7	74.4	2.7	72.5	4.6	.787	.54	.38	.86
8	75.0	4.6	71.8	7.8	.771	.31	2.38	.78
9	75.8	6.9	71.0	11.7	.751	.05	3.67	.69
10	76.3	8.6	70.3	14.6	.734	7.84	4.65	.63
11	76.4	10.5	70.1	16.8	.729	.76	5.49	.59
•								
Noon.	76.4	11.4	69.6	18.2	.717	.62	.98	.56
1	76.1	11.9	69.0	19.0	.704	.46	6.22	.55
2	76.5	11.7	69.5	18.7	.715	.58	.18	.55
3	76.2	12.0	69.0	19.2	.704	.47	.29	.54
4	76.0	11.6	69.0	18.6	.704	.47	.05	.55
5	76.3	10.0	69.3	17.0	.711	.56	5.46	.58
6	76.6	7.6	71.3	12.9	.758	8.11	4.13	.66
7	76.7	5.9	72.6	10.0	.790	.49	3.19	.73
8	76.2	5.2	72.6	8.8	.790	.50	2.77	.75
9	75.8	4.6	72.6	7.8	.790	.52	.42	.78
10	75.5	4.3	72.5	7.3	.787	.51	.24	.79
11	75.3	3.8	72.6	6.5	.790	.54	1.99	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1873.*

Solar Radiation, Weather, &c.

D.	Max. Solar radiation. °	Rain Gauge ½ ft. above Ground. Inches	WIND.		Daily velocity Miles	General aspect of the Sky.
			Prevailing direction.	Pressure		
	140.0		E S E & E	...	87.4	B to 7 A. M., \searrow to 6 P. M., \searrow to 11 P. M.
	144.6		E & S E	...	100.9	B to 7 A. M., \searrow to 6 P. M. B to 11 P. M.
	145.0	2.05	S E & E	1.8	101.5	\searrow to 1 A. M. B to 4 A. M., \searrow to 7 A. M., \searrow to 11 A. M., \searrow to 11 P. M. T & L at 8½ & 11 P. M. R at 8 & 9 P. M.
4	139.4		S W & N E	...	112.6	S to 4 A. M., \searrow to 8 A. M. \searrow to 1 P. M. S to 5 P. M., \searrow to 8 P. M. B to 11 P. M. T at midnight. L at midnight & 1 A. M.
	138.5		E N E & N by W		112.4	B to 11 A. M., \searrow to 5 P. M. B to 11 P. M.
	135.6		N N E & W N W		134.8	B to 5 A. M., \searrow to 11 A. M. B to 5 P. M., \searrow to 9 P. M. B to 11 P. M.
7	137.0		W N W		189.2	B to 6 A. M., \searrow to 2 P. M. B to 11 P. M. Slightly Foggy from 1 to 4 A. M.
8	133.8		N by W & W N W	...	84.5	B.
9	139.0		N W & E by S	...	35.5	\searrow to 4 A. M., B to 6 A. M., \searrow to 5 P. M. B to 8 P. M., \searrow to 11 P. M.
10	137.8		E, E by S & S	0.8	101.5	\searrow to 6 A. M., \searrow to 12 A. M., \searrow to 4 P. M. S to 11 P. M.
11	134.0	0.20	S & S by E	4.0	113.5	O to 7 A. M. S to 6 P. M. O to 11 P. M. Strong wind at 12½ A. M. Slight R at 5½ A. M. 1, 8½ & 9½ P. M.
12	144.5	0.07	E S E, E by N & E		126.9	O to 3 A. M., \searrow to 7 A. M., \searrow to 6 P. M. B to 11 P. M. Slight R at 5½ P. M.
13	138.0	0.08	E N E	0.7	176.9	B to 4 A. M. O to 8 A. M., \searrow to 6 P. M. B to 11 P. M. L at 6½ P. M. Slight R at 8½ A. M. 1½ & 2 P. M.

\searrow i Cirri, — i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati, \searrow i Nimbi,,
 \searrow i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Mile.	
14	139.0		E N E	...	218.5	B to 3 A. M., \i to 6 A. M., \i to 4 P. M., \i to 6 P. M. B to 11 P. M.
15	136.8		E N E & E by N	...	137.8	B to 5 A. M., \i to 12 A. M. \i to 5 P. M. B to 11 P. M.
16	135.0		E by N	...	88.8	B to 10 A. M., \i to 5 P. M. B to 11 P. M.
17	138.0		E by N & E N E		97.4	B to 10 A. M., \i to 6 P. M. B to 11 P. M.
18	141.5		E N E		94.7	B to 11 A. M., \i to 3 P. M. B to 11 P. M.
19	140.7		E N E, E & S S E		85.7	B to 1 A. M. S to 5 A. M., \i to 7 A. M. B to 10 A. M., \i to 6 P. M. B to 11 P. M.
20	137.0		S E & E		92.8	B.
21	145.0		E & S E		65.5	B to 2 A. M., \i to 5 P. M. B to 11 P. M. D at 4½ A. M.
22	138.0		S S E & S by E		72.7	B to 4 A. M., clouds of different kinds to 6 P. M. B to 11 P. M.
23	132.8		S by E		70.0	B to 3 A. M., \i to 3 P. M., \i to 6 P. M. B to 11 P. M.
24	141.0		S by E, E S E & E by S		48.1	B to 3 A. M., \i to 8 A. M. \i to 12 A. M. S to 11 P. M. D at 1 P. M.
25	138.8		E by S & E		19.0	B to 1 A. M., \i to 7 P. M. B to 11 P. M.
26	142.0		E		71.0	B to 4 A. M., \i to 8 P. M. B to 11 P. M.
27	139.0		E & N N E		15.7	B to 5 A. M., \i to 11 P. M. B to 4 A. M., \i to 7 P. M. B to 11 P. M.
28	136.8		N N E, N E & E by N			B to 5 A. M., \i to 11 P. M. B to 3 A. M., \i to 8 P. M. B to 11 P. M.
29	129.0		E by N & E N E			B to 3 A. M., \i to 8 P. M. B to 11 P. M.
30	135.8		E N E & N	0.5	91.0	\i to 3 A. M. B to 12 A. M., \i to 7 P. M. S to 11 P. M.
31	140.0		N & N by W	0.8	184.2	

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.834
Max. height of the Barometer occurred at 9 A. M. on the 10th ...	29.963
Min. height of the Barometer occurred at 4 P. M. on the 3rd ...	29.701
Extreme range of the Barometer during the month ...	0.262
Mean of the daily Max. Pressures	29.899
Ditto ditto Min. ditto	29.778
Mean daily range of the Barometer during the month ...	0.121

	°
Mean Dry Bulb Thermometer for the month	82.0
Max. Temperature occurred at 3 P. M. on the 3rd ...	93.0
Min. Temperature occurred at 6 & 7 A. M. on the 31st ...	69.3
Extreme range of the Temperature during the month ...	23.7
Mean of the daily Max. Temperature	89.0
Ditto ditto Min. ditto,	76.4
Mean daily range of the Temperature during the month ...	12.6

Mean Wet Bulb Thermometer for the month	75.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.4
Computed Mean Dew-point for the month	71.1
Mean Dry Bulb Thermometer above computed mean Dew-point ...	10.9

	Inches.
Mean Elastic force of Vapour for the month	0.753

	Troy grain.
Mean Weight of Vapour for the month	8.10
Additional Weight of Vapour required for complete saturation ...	3.37
Mean degree of humidity for the month; complete saturation being unity	0.71

	°
Mean Max. Solar radiation Thermometer for the month	138.5

	Inches.
Rained 6 days,—Max. fall of rain during 24 hours	2.05
Total amount of rain during the month	2.40
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	2.17
Prevailing direction of the Wind	E. & E. N. E.

* Height 70 feet 10 inches above ground.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

JOURNAL
OF THE
ASIATIC SOCIETY OF BENGAL.



VOL. XLII.
PART I. (HISTORY, LITERATURE, &C.)
(Nos. I to IV.—1873 : with ten plates.)

EDITED BY
THE HONORARY SECRETARIES.



"It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish, if such communications shall be long intermitted ; and it will die away, if they shall entirely cease." SIR WM. JONES.



CALCUTTA :
PRINTED BY G. H. ROUSE, BAPTIST MISSION PRESS.
1873.

CONTENTS

OF THE

JOURNAL, ASIATIC SOCIETY OF BENGAL, FOR 1873.

PART I.

No. I.

	<i>Page</i>
Spirituos Drinks in Ancient India.—By BA'BU BA'JENDRALA'LA MITRA,	1
The History of Pegu.—By Major-General SIR ARTHUR P. PHAYRE, K. C. S. I., C. B.,	23
Postscript to BA'BU RA'JENDRALA'LA MITRA's Paper on Spirituous Drinks in Ancient India,	58
Essays in aid of a Comparative Grammar of the Gauṛian Languages.—By Rev. A. F. RUDOLF HOERNLE, D. Ph. Tübingen, Professor of Sanskrit, Jay Náráyan's College, Benares,	59

No. II.

Note on two Coins from Kausambhi.—By the Honorable E. C. BAYLEY, C. S. I., C. S., (with a woodcut),	109
Rude Stone Monuments in Chutiá Nágpúr and other places.—By COL. E. T. DALTON, C. S. I., Commissioner of Chutiá Nágpúr, (with three plates),	112
The History of Pegu (continued).—By Major General SIR ARTHUR P. PHAYRE, K. C. S. I., C. B.,	120
Notes on the Age of the Ruins chiefly situate at Banáras and Jaunpúr.—By the late MR. CHARLES HORNE, B. C. S.,	160
Studies in the Grammar of Chand Bardái.—By JOHN BEAMES, B. C. S., &c.,	165
Further note on Coins from Kausambhi.—By the Honorable E. C. BAYLEY, C. S. I., C. S.,	191

No. III.

Authorities for the History of the Portuguese in India.—By T. W. H. TOLBORT, B. C. S.,	193
Contributions to the Geography and History of Bengal (Muhammadian Period).—Pt. I., <i>Geographical</i> . Pt. II., <i>Historical</i> , based on <i>Inscriptions received from</i> GENERAL A. CUNNINGHAM, C. S. I., DR. J. WISE, E. V. WESTMACOTT, Esq., W. L. HEELY, Esq., WALTER M. BOURKE, Esq., &c., and on unpublished coins, with notes by E. V. WESTMACOTT, Esq., and DR. J. WISE.—By H. BLOCHMANN, M. A., Calcutta Madrasah, (with six plates),	209

No. IV.

Note on two Muhammadian coins.—By THE HON'BLE E. C. BAYLEY, C. S. I.	311
Note on two Copper Plate Inscriptions (Kanauj).—By RA'JENDRA-LA'LA MITRA',	314
A Metrical Version of the opening Stanzas of Chand's Prithirāj Rāsau. By F. S. GOWSE, M. A., B. C. S.	329
The Initial Coinage of Bengal. Pt. II.—By E. THOMAS, F. R. S. (with a plate),	343

APPENDIX.

A Rough Comparative Vocabulary of some of the Dialects spoken in the "Nágá Hills" District.—By Capt. J. BUTLER, Political Agent, Nágá Hills District,	I
Vocabulary of the Banpará Nágás.—By S. E. PEAL,	XXX

~~~~~

# LIST OF PLATES

IN

JOURNAL, ASIATIC SOCIETY OF BENGAL, FOR 1873,

PART I.

---

- Pl. I (p. 115.). The great Mundá Burialground at Chokuhátá, Chutiá Nágpúr.
- Pl. II (p. 115). Monumental Stones in Chutiá Nágpúr.
- Pl. III (p. 115). Regadhi Monumental Stones with Ghost seats.  
(p. 164). Incised writings on Stones at Bakhariyá Khand, Banáras.
- Pl. IV (p. 242). Magni Mogolis Imperium, according to Blaeu's Map (1650).
- Pl. V }  
Pl. VI } Facsimiles of Bengal Muhammadan Inscriptions.  
Pl. VII }
- Pl. VIII }  
Pl. IX } Unpublished coins of the Muhammadan kings of Bengal.
- Pl. X. Initial Muhammadan coinage of Bengal.

## *Woodcuts.*

1. 2. (p. 110), Two ancient coins from Kausambhi.
  3. (p. 269), Coin of Náçiruddín Abul Muzaffar Mahmúd Sháh (I) of Bengal.
  4. (p. 288), Coin of Fírúz Sháh (II) of Bengal.
  5. (p. 312), Coin of Muzaffar Sháh of Bengal.
-



# ERRATA

IN

JOURNAL, ASIATIC SOCIETY OF BENGAL, FOR 1873,

PART I.

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- Page 61, line 36, *for सन read सनो.*  
— 64, line 30, *for चंपका read चंपको.*  
— 71, line 17, *for जाया read जायो.*  
— 74, line 33, *for एषनस read एषनस्.*  
— 81, line 6, *for चय read चयु.*  
— 81, line 33, *for ककुंचं read कुकुंचं.*  
— 81, line 33, *for ककुमस् read कुकुमस्.*  
— 85, line 22, *for Skr. Pr. and गोखानी read Skr. गोखानी and Pr. गोखानी.*  
— 80, line 37, }  
— 86, line 9, } *for मरिष read मरिष.*  
— 100, line 6, }  
— 103, line 1, }  
— 85, line 16, } *for दधिनः read दधः.*  
— 101, line 7, }  
— 222, line 10, *for river read G'hágrá river.*  
— 235, line 1, *for to read and to.*  
— „ line 25, *for downfall read downfal.*  
— 236, line second note, *for Koch read of Koch.*
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# INDEX

TO

JOURNAL, ASIATIC SOCIETY OF BENGAL, FOR 1873.

## PART I.

- A**  
**ABRUS** precatorius, 346  
 abwáb, taxes, 219  
 Adam Shahíd, a Bengal saint, 285  
 A-da-ra, king of Pegu, 56  
 A-di-ka, king of Pegu, 56  
 'Adilpúr in Eastern Bengal, 226*n.*, 228  
 Adinali Mosque, 256, 257  
 Adinna Radza, 130  
 Ægle marincelos, 17  
 Agamavagisa, 18  
 Agardip, 229*n.*  
 Ag Mahall, 218, 224  
 Ahmad Pír-pahár, a Bengal saint, 299  
 Ahmad Shah, Shamsuddin Noat Mújáhid,  
     of Bengal, 268  
 Áí, a Koch divinity, 240  
 aikshava, or cane liquor, 16  
 Aju bemoans the loss of his wife, 9  
 Ajítasatru, 111  
 Akbarnagar, in Bengal, 218  
 Akhánwan, 41  
 'Aláipúr, 227*n.*, 228*n.*  
 'Alangrimagar, (Koch Bihár), 241  
 Alangk'hálí River, 229*n.*  
 'Alá-ud-dín Jání, 349  
 'Alá ul Haq, a Bengal saint, 256, 261  
 Albuquerque, Commentaries of, 196  
 Alexander the Great, 232  
 Alfá Khán, or Alfá Husainí, a Bangálí noble-  
     man, 298  
 'Alí Sháh, 'Aláuddin Abul Muzaffar, of Ben-  
     gal, 252  
 Alkamsh, of Dihlí, 349, 350, 359  
 Alvares, Francisco, 200  
 A-min-na Radza, king of Pegu, 56  
 Amin Ráwí, a historian, 214  
 Anang Bhím Deo, of Orissá, 344  
 Anurahta, 40  
 Andropogon muricatum, 19  
 Anethum sowa, 19  
 Angira against wine, 4  
 Ansu-la, king of Pegu, 56  
 Antonio Galvan, works of, 196  
 Anwar, Shaikh, 262, 266  
 A-ra-ka, king of Pegu, 55  
 Arakan, 232, 233, 234*n.*, 237*n.*  
 arishta, or soap berry liquor, 16  
 arrack, prohibited to Kshatriyas, 5  
 Ásám, 235, 236, 239*n.*  
 Ásava, 6  
 Asclepias acidif, 21  
 Asparagus racemosus, 17  
 Atálah Mosque, 160  
 Athárabanká River, 227*n.*  
 A-thek-ka Radza, king of Pegu, 56  
 A-tu-thu Radza, king of Pegu, 57  
 Audambar, 217  
 Aurangpúr, 229  
 Aurangzib, 216*n.*  
 Avadansa, 20  
 Avadānas, stories of drunkenness in, 8  
 A'zam Sháh, Ghiyās ud-dín Abul Muzaffar,  
     257, 258  
 'Azimnagar, Dháká District, 284  
 Azo, [Hájo] Ásám, 235
- B**  
 BABA Adam, a saint, 285  
 Bába Sálíh and his mosques, 283  
 Badaoni, 238*n.*  
 Bad-da-ra Radza, 56  
 Badr i 'Álam, a saint, 302  
 Badrul Islám, Shaikh, 264  
 Bagdí, a part of Bengal, 211, 349*n.*  
 Bágherhát, 227  
 Bágo, the native name of Pegu, 24  
 Bahádur, the Tirhut rebel, 248*n.*  
 Bahádur Sháh, Ghiyās ud-dín, of Bengal,  
     250, 347  
 Báhírband, 224, 240  
 Bajit-pore, 263*n.*  
 Bakharyákund, Inscriptions at, 163  
 Baklá, or *Bacala*, 217, 226, 228, 229  
 Baklesar, in Bírbbáh, 221  
 Balaunja, Parganah of, 119

Uttarpara

Calcutta Public Library

- Balban, 238, 248  
 Baleswar (Balasore), 225n.  
 Ballál Sen, of Bengal, 211, 221, 230n., 284, 349n.  
 Banáras, ruins of, 160  
 Bandar, near Dháká, 232, 282  
 Bandar Díú Mahall, 260  
 Banga, or Bangadesh, 211, 237, 349n.  
 Bangálah, 212  
 Bangálbhúm, 224  
 Bangálís, pay readily taxes 219n.; make bad soldiers, 255  
 Bannagar, 274  
 Banpará Nágás, vocabularies of, *vide* Appendix  
 Báqiranj, 228  
 Baramtalá, 238  
 Baránusi, 238  
 Bárbak, the Eunuch, 281, 287  
 Bárbak Sháh, Rukn ud-dín Abul Mujáhid, 215, 269, 272  
 Barbakábád, 215  
 Barbaksingh, in Bengal, 278  
 Barbosa, Odoardo, 201  
 Bardwán, 218, 223  
 Barendra, a part of Bengal, 211, 349n.  
 Barcunda, *vide* Bharkúndah  
 Barítalah, 221, 235  
 Barros, Joao de, 194, 214, 287  
 Bartholomeus, History of Indian Christianity, 199  
 Barúr, a Parganah, 273  
 bases, inflexional, of the Gaupian Languages, 59  
 Bassia latifolia, 17  
 Bastar, 239  
 Báyzid Majlis, 229  
 Báyzidpúr, 263n.  
 Báyzid Sháh, Shiháb-ud-dín Abul Muzaffar, 259, 262, 268  
 Bayley, The Hon. E. C., on Kausambhi coins, 109, 191  
 „ „ „ „ on Muhammadan coins, 311  
 Bézáhá, 216, 235  
 Beames, J. on the Grammar of Chand Bardái, 165  
 Bengal, divisions of, 211, 349; list of kings, 308; *vide* Bangálah.  
 Bengala, or Bengola, a doubtful town, 233  
 Bhabeshwar Rai, 217  
 Bhágvata Purana, quotations from the, 10  
 Bhagirathi River, changes its course, 220n., 221n.  
 Bhangrah, meaning, 253  
 Bharkúndah, 223  
 Bháti, or Sundarban, 226  
 Bhatúriah, 263  
 Bhitarband, 224, 235, 239, 240  
 Bhitargarh, 223n.  
 Bhoja, a prince of Kanauj, 815  
 Bhowálbhúm, 224  
 Bhám, in proper nouns, 224  
 Bhumma Radza, king of Pegu, 56  
 Bihár, 221, 222, 251  
 Bihár Inscriptions, 245, 299 ff.  
 Bijai Manik, 236  
 Bikrampur, Dháká District, 232, 284, 349n.  
 Binya Dhamma Radza, of Pegu, 120, 159  
 Binya-e-láu, king of Pegu, 159  
 Binya keng, king of Pegu, 159  
 Binya-uwe, king of Pegu, 159  
 Binya-Ran, king of Pegu, 159  
 Binya Raukit, king of Pegu, 120, 159  
 Binya-u, king of Pegu, 44, 159  
 Binya Waru, king of Pegu, 121, 159  
 Birbhúm, 212, 222n., 223  
 Birnagar, 218  
 Bishnkoí, 212n.  
 Bishnpúr, 222  
 Blaeu's map of Bengal and India, 242  
 Blochmann, Contributions to the Geography and History of Bengal, 208  
 Bocarro, Antonio, 199  
 Bohát, 260n.  
 Borhun, 214n., 232  
 Borkela, burial slabs at, 112  
 Bosnah, 229  
 Bourke, W. M., Benral inscriptions, 209, 290  
 Brahma Dut, king of Pegu, 56  
 Brahmaputra, 236  
 Buddha Ghosha, 28  
 Buddha king, Thaha jita Mita, 111  
 Buddha, relics of, in Rangoon, 26  
 Bughdah Sháh, Shiháb-ud-dín, of Bengal, 250  
 Bundu, 115  
 Burunda, 115  
 Butler, J., comparative vocabulary of tribes in the Nágá Hills, *vide* Appendix  
 Buzurgmedpúr, 229  
 Byát-ta-lá, 46  
 CACCHEGATE, (Bengal) 240  
 çahan, a stuff, 216  
 Calcutta, 217  
 Camoens, the Portuguese poet, 197  
 Caor, or Brahmaputra, 236  
 Cassia arabica, 18  
 Castanheda, the Portuguese historian, 195  
 Castro, 197  
 cat, 261n.  
 cenotaphs of the Kasias, 117  
 Cernove, 214n.  
 Chai Champá, in Hazárfagh, 300  
 Chakahana, 20  
 Chand Bardái, grammar of, 165, 329  
 Chandabhandas, a tribe, 226  
 Chandpúr, 227n.  
 Chandiján, 221  
 Chandradíp, 226  
 Chandradeva, gets Kanauj, 816

Chandrakoná, 218, 223  
 Char Mukundia, 229, 232n.  
 Chátágon (Chittagong) 217, 220, 228n., 220,  
 233, 234, 298, 299  
 Chauk'handí, 215  
 Chaumuhá, in Húglí, 214n.  
 Chichukotá, 240  
 Chihil Ghází, a saint, 273  
 Chilmári, 235  
 Chokahátu (Chutiá Nágpúr), 115  
 Chokuria, 232  
 Chronicles of the Mun tribe, 40  
 Chudangpha, of Asám, 235  
 Chutiá Nágpúr, monuments in, 112  
 Chuttiá-pattá, a marsh, 213  
 Cochlin, Day's History of, 198  
 Codavascam, 233  
 coinage, silver, 344; of Bengal, 343  
 coins, of Kausambhi, 109; Muhammadan,  
 205, 269, 311, 345  
*Comola, vide Kámatá.*  
 conversions to Islám, 220, 265  
 Correa, a Portuguese historian, 193  
 corruptions, of names, in Bengali, 216n.,  
 231n.  
*Cos Assam, 244n*  
*Cospetir, identified, 223, 224*  
 Coutinho (Lopo de Sousa), siege of Díú, 196  
 cowrie money, 344, 345  
 Croton polyandrum, 17  
*Cupitavaz, identified, 231*  
 Cunningham, A., General, inscriptions, 209,  
 247, 248, 256, 270, 271, 285, 288, 292,  
 298, 307  
 cyclones, in Bengal, 230

**D**ACRUZ, affairs of China, 196  
 Dak'hin Shahbázpúr, 217, 226  
 Dalton (Col. E. T.), on stone monuments  
 in Chutiá Nágpúr, 112  
 Damdamá, 211  
*dángá, in Bengali names, 233n.*  
 Dapara, or Daspara, 231  
 Darbhanga, 241  
 Darlá River, 240  
 Dáruharu, village of, 115  
 Daryá Khán Lohání, 221  
 De Barros, 194; *vide* Barros.  
 De Goes (Damiao), Chronicles of king  
 Manuel, 196  
 De Couto, Diego, a Portuguese historian,  
 194  
 De Laët, 225, 234n., 242, 244  
 De Laval, 201  
 delirium tremens, Sanskrit words for, 21  
 De Resende (Garcia), Life of Joao II, 196  
 De Sousa, History of the Dominicans, 199  
 Deokot (Debkot), 211, 212, 239, 274, 348  
 Devala against wine, 4  
 Devapala Sarma, 315  
 Devayani, daughter of Sukrácharya, 3

Dháká, 216n., 226, 228, 232  
 Dhamma bi-yá, king of Pegu, 56  
 Dham-má Dzedi, king of Pegu, 159  
 Dhamma Dhadza, 55  
 Dhammá Pála, 55  
 Dhamma Radza, 56  
 Dhamma Thanka, 55  
*Dianga, 233*  
 Dihlí, 362  
 Diláwar Khán, of Sondíp, 231  
 Dínájpúr, 256, 263, 263n., 266, 272, 273  
 Dip-pa Radza, king of Pegu, 56  
*Dipuria, 231*  
 distilling of liquor, 18  
 Díú, in Gujarát, 260n.  
 Dodalá, a village name, 213n.  
 dog, 261n.  
 Don Manik Islands, 228  
 dráksha, or grape liquor, 16  
 drinking, praise of, 14  
 Dúárs, the, 241  
 Dzau-au, 43, 159  
 Dzau-dzíp, king of Pegu, 44, 159  
 Dzau-ta Kumma, 55  
 Dzaya, identified with Jaya Sinha, 33  
 Dzeya Radza, king of Pegu, 56

**E**DILPORE, *vide* 'Adilpúr.  
 Ekdálah, Fort, 212, 213n., 254  
 Enga-Thamanda Radza, 57  
 Eng-gu-ra, 55  
 English, the, their character, 210n.  
 Eunuchs, 216; their names, 286n., 304n.

**F**'AKHR UD-DÍN Lágharí, 237  
 Faria y Souza, a Portuguese Historian, 195  
 Faridpúr, 217, 226, 228, 229  
 Farid-ud-dín Ganj i Shakar, 261n.  
 Fath Sháh, Jalál-ud-dín Abul Muzaffar, of  
 Bengal, 218, 228n., 281  
 Fátih Singh, 218  
 Fathábád (Bengal), 214, 217, 226, 228, 282,  
 292, 313  
 Fergusson's opinion on Afálah Mosque,  
 160  
 Fidái Khán, governor of Bengal, 219;—of  
 Tirlut, 241  
 Firingi Bázár, 228n.  
 Firingis, 220, 228n.; *vide* Portuguese  
 Firúzábád, *vide* Hazrat Panduah.  
 Firúzpúr, near Gaur, 254  
 Firúzpurábád (?), 254  
 Firúz Sháh (III.), 'Alá-ud-dín Abul Muzaf-  
 far, of Bengal, 297  
 Firúz Sháh (III.), of Dihlí, 252, 254n., 256n.,  
 301  
 Firúz Sháh (II.), Saif ud-dín Abul Muzaffar,  
 of Bengal, 287  
 Firúz Sháh (I.), Shams ud-dín Abul Muzaf-  
 far, of Bengal, 249, 250

- Fitch, Ralph, 214, 230, 234*n.*, 240  
 Fontainhas, Gabinete Litterario das, 208  
 foreign wines, notice of, 19  
 Frederick, Cæsar, the traveller, 214, 229  
 frontiers of Bengal, 220; Western frontier, 221; Southern—225; Eastern—234; Northern—239
- G**AHADAVALA, founder of a dynasty, 315  
 Ganda Radza, king of Pegu, 56  
 Ganga, arrack vowed to, 7  
 Gangarâmpûr, 212, 290  
 Gaphî, or Taliâgarh, 215, 222, 223  
 gaudi, or rum, 5  
 Gauhatti, 235  
 Gaur, or Lak'hnauti, 211, 212, 213, 215, 237, 250, 251, 260*n.*, 267, 276, 277, 299*n.*, 312, 313, 348; *vide* Jannatâbâd  
 Gaur, in Silhat, 236, 243  
 Gaur Gobind, of Silhat, 279  
 Gaurian Languages, grammar of, 59  
 Geinda Radza, of Pegu, 57  
 G'hargâon (Assâm), 236  
 Ghâziপুর, on the Bhagirathi, 220*n.*  
 Ghâzi Shâh, Ikhtiyâr ud-dîn Abul Muzaffar, of Bengal, 254  
 Ghiyâspûr, 213*n.*  
 Ghiyâs-uddîn 'Iwaz, of Bengal, 348  
 G'hôrâg'hât, 215, 221, 239  
 Ghulâm Husain Salim, author of the 'Riyâz-us-salâtîn', 209  
 Gits-ta-wi-sya, king of Pegu, 57  
 Goâlpârah, near Panduah, 256  
 gold, its proportional value to silver, 347  
 Gouvea's history of the Archbishopric of Goa, 198  
 Governors of Bengal, 246, 348  
 Govindachandra Deva, Inscription of, 314  
 Gor, in Silhat, *vide* Gaur  
 grog, Tantric purification of, 18  
 Growse, F. S., Metrical version of Prithirâj Râsau, 329
- H**AFT *Iqlim*, title of a history, 214  
 Hâjî Ilyâs, *vide* Ilyâs Shâh.  
 Hâjî Muhammad Qandahârî, a historian, 288  
 Hâjîpûr, founded, 221  
 Hajrahattî, 221  
 Hamzah Shâh, Saif-ud-dîn Abul Mujâhid, of Bengal, 259, 368, 370  
 Hâns Kumâr, Râjah of Rohâsagarh, 300  
 Hanthawati, 29  
 Hariâl, 221  
 Haringhâtâ River, 226  
 Harwa, 221  
 Hatiâgarh, 225, 227  
 Hâtîm Khân, of Bengal, 240, 250  
 Hattalah, 235
- Hazrat Panduah, or Firâzâbâd, or Purroa, 212, 213*n.*, 238, 253, 256, 262, 267, 271  
 Heeley, W. L., Bengal inscriptions, 209  
 Henry the Navigator, Life of, 193  
 Herculano, History of the Inquisition in Portugal, 199  
 Hijli, 224, 225  
 Hornlo, A. F. R., on Gaurian Languages, 59  
 Horne, C., on Banâras ruins, 160  
 hospitals, for animals, 241  
 Hough's Christianity in India, 198  
 Hûglî, its name, 217, 228*n.*  
 human sacrifices, in Koch Bihâr, 240  
 Husainâbâd, a Bengal mint town, 214, 298  
 Husainî Dynasty, of Bengal, 291  
 Husain Shâh, 'Alâ-ud-dîn Abul Muzaffar, of Bengal, 222, 227, 234, 235, 240, 292, 311  
 Husâm-uddîn Khiljî, of Bengal, 348
- I**BN Batûtah, 233, 236, 252, 281  
 Ibrâhîm Bayyû, Malik, of Bihâr, 300  
 Ibrâhîm Shâh, Shams-uddîn Abul Muzaffar, of Jaunpûr, 264, 265, 306  
 Idrâkpûr, 226, 230*n.*  
 Ilâh Virdî Khân, 241  
 Ilyâs Shâh, Shams-uddîn Abul Muzaffar, of Bengal, 221, 253, 254, 257, 281  
 Indumati, wife of Aja, 9  
 inscriptions, at Dillî, 362  
 insignia of royalty, 362  
 Iqlîm Mu'azzamâbâd, *vide* Mu'azzamâbâd.  
 'Isâ Khân, 231  
 Ishwarîpûr, 227*n.*  
 Ismâ'îlpûr, 217, 218
- J**ABUNKA or Jamunâ River, (Bengal) 214, 244*n.*  
 Jadû, son of Râjah Kâns, 265, 266  
 Ja'far, Nawab, Murshid Qulî Khân, 218, 219  
 Jagdâl, 213*n.*  
 Jahanâbâd, 218, 223  
 Jâjnagar, 237*n.*, 355*n.*  
 Jâjpûr, 237, 355  
 Jalâl-uddîn Tabrizî, a saint, 253, 260  
 Jalâl of Silhat, *vide* Shâlî Jalâl  
 Jannatâbâd, (Bengal) 215, 313; *vide* Gaur  
 Japla, Parganah of, 119  
 Jatakas, stories of drunkenness in, 8  
 Jatmall, son of Râjah Kâns, 266  
 Jatmallpûr, 266  
 Jaunpûr, 160, 284*n.*  
 Jaunpûr Dynasty, 304  
 Jaunpûrnâmâh, 160  
 Jeffery (Eastern Bengal), 232  
 Jowar (Jesoro), 217  
 Jesval, 241, 244  
 Jhâp'hand, 223  
 jîtal, a coin, 346

Jogdiah, 232  
 Jor, a Parganah, 273

**K**ACHA, son of Vrihaspati, 3  
 Kachhár, 235  
 Kádamvari, 18  
 Kai Káús, Rukn-ud-dín, of Bengal, 247, 249  
 Kámatá, 236, 239  
 Kámatápúr, 240  
 Kämpfer's Japan, 200  
 Kámrúp, or Kámrúd, 212*n.*, 216, 235, 236  
 Kanauj, copper grants of, 314  
*káná*, a coin, 346  
 Káns, Rájah, 234, 235, 258, 259, 262, 263, 264, 268  
 Kan'thulbarí, 241  
 Karatayá River, 215, 216, 235  
 Ka-ra-wika Rádza, king of Pegu, 57  
 Karibári Hills, 235  
 Karla, the last prince of Kanauj, 315  
 Kaṭak, or Kaṭak Banárus, 238*n.*  
 Katásan, 237  
 Katha Kumma, king of Pegu, 57  
 Ká-tha-wun, 55  
 Kuula, sect of the, 11  
 Kausambhi, coins of 109, 191  
 Ke-tha-rit Radza, 56  
*khdçak*, a stuff, 8  
 K'hulzáon, 222, 222*n.*  
 Khalifátabád, 214, 217, 227, 231  
 Khán Jahán, of Khalifátabád, 237  
 Kharid, in A'zamgarh District, 297  
 khárijura, or date liquor, 16  
 Khe-báung taken, 54  
 Khizrpúr, near Dháká, 282  
 K'hontag'hát, 239  
 Khun-lau, king of Pegu, 159  
 Khurdah, Rájahs of, 314*n.*  
 Kichuka, brother to Sudeshná, 6  
 Koch Ásám, 244*n.*  
 Koch Bihár, 239, 240, 245  
 Koch Hájo, 235  
 Koina (the), 113  
 kolí, or jujube liquor, 16  
 Kuhn-lau, brother to Wareru, 143  
 Kunara Sambhava, quotations from the, 9

**LA** Croze, Christianity in India, 198  
 Laftan, Portuguese discoveries, 195  
 Lak'hmaniyah kings of Bengal, 211  
 Lak'hnaúti; *vide* Gaur  
 Lak'huúr, 211, 223*n.*, 237  
 Lal Darwázah, Hindu pillar at, 163  
 Land Tenures mentioned in copper plate grants, 318  
 Láopallah, 214  
 Larka Kola, monumental stones of the, 112  
 Láúq, or Láúr (Silhat), 214, 235, 236  
 Lee, History of the Syrian Church, 198  
 Ligusticum ajwana, 19

Linschoten's Itinerarium, 201  
 Lukrakhonda, 222*n.*

**M**A'CUM Khán, 241  
 Madáran, 218, 223  
 madatanka, or delirium tremens, 21  
 Madátyaya, 21  
 Madavyádli, 21  
 mádlhuka, or honey liquor, 16  
 madhuka or mowa spirit, 5  
 Madhúmatí River, 226  
 Madyapásana, 20  
 Maffei, Historia Indica, 198  
 Mágha, quotations from the, 10  
 Mags, 225, 228, 234*n.*, 244  
 Mahá-Bad-dara, king of Pegu, 55  
 Mahábhárat, quotations from the, against the use of spirits, 3  
 Mahánandá River, 211, 213, 215, 263  
 Mahá Radzá weng, 27  
 Mahá-thá-la, king of Pegu, 55  
 Mahá-thungada, king of Pegu, 56  
 Maha Tsit-ta, king of Pegu, 56  
 Mahendrapála, land grant of, 316  
 Mahichandra, father of Chandra Deva, 316  
 Mahimu Arindu Radza, 57  
 Mahimu Thawala Kumára, 57  
 Ma-hing-tha Radza, 56  
 Mahmúdábád, 217, 235  
 Mahmúdpúr, 229  
 Mahmúd Sháh, of Jaunpúr, 304, 306  
 Mahmúd Sháh (I.), Náçir-ud-dín Abul Muzaññir, of Bengal, 269 ff.  
 Mahmúd Sháh, of Dihli, 304  
 Mahmúd Sháh, Náçir-ud-dín Abul Muzaffar, of Dihli, 247, 248*n.*  
 Mahmúd Sháh (III.), Ghiyás-ud-dín Abul Muzaffar, of Bengal, 222*n.*, 298  
 Mahmúd Sháh, (II) Náçir-ud-dín Abul Muzaffar, of Bengal, 289  
 Mahobákhand, 165  
 Maimun'singh, 235  
 mairéya, or rum, 16  
 mairéya wine, 6  
 Makhçúçábád, 218  
 Makhçúç Khán, 218*n.*  
 Malabar, History of the Church of, 198  
 Malaca Conquistada, a Portuguese epic, 198  
 Máldah, 215, 294  
 Maldives, 260*n.*  
 Malikpúr Koyi, near Dihli, 362*n.*  
 Máljhhattá, Híjli, 225  
 Mandaka Radza, 56  
 Mandalg'hát, 218, 222, 223  
 Man-da Radza, king of Pegu, 56  
 Mangalkot, near Bardwán, 296  
 Mani Radza, king of Pegu, 56  
 Manonchi, Aurangzebe's physician, 198  
 Mán Singh, 218  
 Manu against the use of spirits, 3  
 Ma-nu-ha Radza, 56

Manyá Radza, 56  
 Machain, Dháká District, 292, 293  
 Ma-rá-di Radza, 56  
 Marco Polo, 216  
*mark*, a gold weight, 344, 345  
 Mária, Vincenzo, 200  
 Márkandeya Purána, quotations from the, 10  
 Marsden's Sumatra, 200  
 Masjidkur, 227  
 Masnad 'Alipúr, 225*n*.  
 Mech tribe, 239  
 Medinipúr, 224  
 Mcneitipúr, 223*n*.  
 Meng-Bala, 43  
 Meng Kyi-tswá Tsau-ke, 40  
 Mewát, 244  
 Mhan-dan, king of Pegu, 159  
 Mig-gu dih-ba Radza, 57  
 Mihmásháhi, 216  
 Míráth, 302  
 Mír Jumla, 241  
 Mírzá Khán, 241  
 Mithilá, a part of Bengal, 211, 239*n*., 340*n*.  
 Monhyin Mengtará, 121  
 Morang, 241, 244  
 Moulavadangur, 223*n*.  
*Mozoomdar*, explained, 214*n*.  
 Mu'azzamábád, or Iqlín Mu'azzamábád, 213*n*., 214, 235, 250  
 Mu'azzampúr, 236  
 Mubárák Sháh, Fakhr-ud-dín Abul Muzaffar, of Bengal, 233, 252, 256*n*.  
*muetrá*, or wine biscuits, 20  
 Mughulmárá, 224, 211  
 Muhammad Sháh, Abul Mujáhid, of Dihlí, 251, 299  
 Muhammad Sháh, of Binár, 231, 222  
 Muhammad Sháh, of Dihlí, 303  
 Muhammad Sháh, Jalál-ud-dín Abul Muzaffar, of Bengal, 266, 268  
 Muhammad Tughluq, of Dihlí, 251, 299  
 Muhammadans, in Bengal, 220, 343  
 Muhammadan coins, notes on, 311, 350  
*muhr i nubuwwat*, 273, 274  
 Mukund, of Bosnah, 229  
 Mukund Deb, of Orísá, 224, 344*n*.  
 Mun, or the people of Pegu, 34, 35  
 Murád Khán, 228, 229  
 Murádkhánah, 229  
 Murshidábád, 218  
 Murshid Qulí, *vide* Ja'far.  
 Muzaffar Sháh, Shams-ud-dín Abul Nasr, of Bengal, 289; coin of, 311

**N**ACIR Khán, 268  
 Nácir-ud-dín Khusrá, coins of, 311  
 Nácir-ud-dín Mahmúd, name of two sons of Altamah, 362  
 Nácir-ud-dín Sipahsálar, 279, 280  
 Nadiyá, 211, 212*n*., 221*n*., 343

Nágá Hills, vocabularies of tribes in, *vide* Appendix  
 Nágánanda, drunkenness in, 8  
 Nágor, in Bírbbhúm, 212, 221 260*n*.; in Jodhpúr, 260*n*.  
 nakulí, or wine biscuits, 20  
 names, of Eunuchs, 286*n*.  
 Nara Radza, king of Pegu, 56  
 Nara-thúra, king of Pegu, 55  
 Nara-thu Radza, king of Pegu, 56  
 nárikelaja, or cocoanut liquor, 16  
*nawárá*, or fleet, 220  
 Názirpúr, 228  
 Nicolo Conti, the traveller, 214*n*.  
 Nilamba, Rájah, 240  
*Noldy*, 231  
 Norikol, 232  
 Nuçrat Sháh, Nácir-ud-dín Abul Muzaffar, of Bengal, 220, 222, 227, 231, 295  
 Núdiya, old for Nadiya, 212*n*., 313  
 Núr Jahán, 214, 229*n*.  
 Núr Quṭb 'Alam, a saint, 260*n*., 262, 264

**O**LK, in Bengal, 218  
 Orísá, 224, 238; rev-nue of, in 12th century, 341; 355  
 Osorio, Bishop of Sylves, 196

**P**ACIET, 222  
*Pacaculi*, 231  
 Padmáwatí, 238  
 Páiks, of Bengal, 255  
 paishti, or arrack, 5  
 Paithinasi against wine, 4  
 pánaśa, or jack liquor, 16  
 Paṇḍuah, in Húglí, 232, 275  
 Paṇḍuah, *vide* Hazrat Paṇḍuah.  
 Panjrah, 215, 239, 263*n*.  
 Patgráo, or Patgrán, 239  
 Peal, S. E., Vocabulary of the Banpará Nágás, *vide* Appendix.  
 Pegú, 230*n*.  
 Pegu, Founder of, 30, 57  
 Pegu, History of, 23, 120  
 Pegu, Invasion of, 52  
 Pegu kings, list of, 57  
 Pegu, traditional history of, 25  
 Peppé, T. F., on Monumental stones, 119  
*Perselis* River, 244  
 Phani River, 226  
 Phayre, Sir A. P., History of Pegu, 23, 120  
 Piplí, 225*n*.  
 Pita-kat, or Buddhist books, 28  
 police, military, of Bengal, 255  
 Porto Grando, or Chittagong, 228*n*.  
 Porto Piqueno, or Húglí, 228*n*.  
 Portuguese, their Indian histories, 194; 225, 228; employed as soldiers in Bengal, 199; *vide* Firingis.  
 Portuguese in India, Authorities for the History of the, 193

Pratāpāditya, Rājah, 227*n*.  
 Prithirāj Rāsa, 165, 329  
 Pun-na-rika Radza, king of Pegu, 57  
 Purchas, the historian, 225, 233  
 Purniah, 215, 239

**Q**ADAR Khān, 253  
 Qarāqalpāk tribe, 239  
 Qazfhattī, 221  
 Qutb-ud-dīn Mubārak Shah, 311

**R**ADHA, (Rarha) a part of Bengal, 211,  
 223, 237, 349*n*.

Rādzādirit, 48  
 Radza Thūra, king of Pegu, 56  
 Raghuvansa, quotations from the, 9  
*Ragiawarra*, 241  
 Rāipūr, 244  
 Rājā Bayābānī, a saint, 260*n*.  
 Rājendralāla Mitra, on Spirituous Drinks in  
 India, I, 58  
 " , on two copper plate inscriptions  
 from Kanauij, 314

Rāj Mahall, 218  
*Rāj Mālā*, history of Tiparah, 234, 236*n*.  
 Rājāwārā, 241  
 Rakhang, *vide* Arakan,  
 Rāmanya, or the country of Pegu, 24  
 Rānū, 233, 234*n*.  
 Rāngāmātī, 215 ;—on the Brahmaputra,  
 220 ;—in Tiparah, 237  
 Rangpūr, 212*n*, 239  
 Rānigunj, 224  
 Rasūlpūr, or Jesar, 217  
 Rasūlpūr River, 225  
 Ratanpūr, 239  
*rati*, true weight of, 346  
 Raushanāhād, or Tiparah, 237  
 Raziyah, queen of Dihlī, 248*n*, 343  
 revenue, of Bengal, from 1582 to 1762, 219 ;  
 of Koch Bihār, 241 ; of Orisā, 344  
 Rivara, Sr. da Cunha, 203  
*Riyāzussalātīn*, a Bengal History, 209  
 roads, in Bengal, 220  
 Rohtāsgarh (Bihār), 300  
 Rouso, village of, 114  
 Roteiro (The), Vasco de Gama's account, 196

**SA**HWAN, on the Indus, 222  
 saina, or long pepper liquor, 16  
 Sakuntala, scenes of drunkenness in, 8  
 Salimābād, 218, 227  
 San Romano, a Portuguese Historian, 195  
 Santāls, 300  
 Saranda Pir, Hills of, 118  
 Saraswatī River, 243, 244*n*.  
 Saraswatī River, in Hūglī, 214*n*.  
 Sarostema viminalis, 21  
 Sa'id Khān, governor of Bihār, 218*n*.

Sarhat, in Bīrbhūm, 214, 222*n*.  
 sarlashkar, an officer, 214  
 Sātgrāon, 212, 213*n*, 214*n*, 217, 227, 239,  
 251, 270  
 Satgarh (?), 238  
 Satrapūr, 221*n*.  
 Satrjīst of Bosnah, 229  
 Satrjītpūr, 229  
 Sautrāmāni, 22  
 seal of prophethip, 273, 274  
*Sersily*, 243  
 Shādī Khān, 268  
 Shāhbāndar, 225*n*.  
 Shāhbāzpūr, 8  
 Shāh Jalāl, of Silhat, 277, 278, 293  
 Shāh Langar, 236  
 Shahr i Nau, 213*n*, 214*n*.  
 Shāhzādpūr, 221  
 Shaukh Akhī Sirāj 'Usmān, 260  
 Shāistalunagar, 229  
 Shams-ud-dīn (?), son of Hamzah Shāh, 259,  
 264, 268  
 Shan kings of Pegu, list of, 159  
 Shans, rebellion of the, 51  
 Sharifābād, 218  
 Sheng-tau-bu, king of Pegu, 159  
 Shergarh, 224  
 Sherpūr 'Atāī, 218  
 Sherpūr Firingī, 228*n*, 230  
 Sherpūr Murcha, 216, 221 ;—Maimansingh,  
 234  
 Sher Shāh, of Dihlī, 217, 285*n*.  
 Shihāb-ud-dīn, *vide* Bayazid Shāh.  
 Shihāb-ud-dīn, Qāzī, of Jaunpūr, 265  
 shiqdār, an officer, 214  
 Shukl Gosāin, of Koch Bihār, 240  
 Shujā', Prince, his rentroll, 219, 241 ; a  
 false Shujā', 241  
 Siam, kings of, 49  
 Sīdī Badr Dīwānah, 289  
 Sidhū, 217  
 Sikandar Pahlawān, 225  
 Sikandarpūr, near A'zamgarh, 296  
 Sikandar Shāh, Abul Mujāhid, of Bengal,  
 255*n*, 256, 279, 281  
 Sikandar Shāh (II.) of Bengal, 281  
 Sik'karbhūm, 224  
 Silhat, 216, 234, 235, 236, 278  
 silk, raw, 215, 240  
 silver, import of, 230*n*.  
 Sirguja, 239  
 Sirkārs, list of, 215  
 Sirisa Kutumba, 119  
*Sirote*, 236  
 Sita vows wine to Yamuna, 7  
 Sītāram Rāi, 229  
*Siyar ul-Mutaakkharīn*, a history, 217*n*.  
 Sondip Island, 217, 226, 229, 230, 231  
 Soma nectar, 21  
 Sosang, (Gāro Hills) 235  
 soura wine, directions for preparing, 23  
 spirit, ban of Sukracharya against, 3



- spirit, use of, prohibited in the Vedas, 2  
 spirituous drink in Ancient India, 1, 58  
 Srīhat, 236  
 Srimanta, the merchant, 218  
 Sudeśhnā, queen Virāta, 6  
 Sukrāchary, anecdote of, 3  
 Sulaimānābād, 218  
 Sulaimān Shāh, 218  
*sulān*, a Mammadan title, 350*n*.  
 Sultān Shābzādah, of Bengal, 287  
 Sundarban, 226; cultivated formerly, 231  
 Sunnārgaon, 212, 213*n*., 216 231, 233*n*.,  
 236, 237, 238, 251, 261, 283, 285, 295  
 Sunnāragarhi, 256*n*.,  
 Sunnārkoṭ, 256  
 surā, or arrack, 16  
 surā wine, 6  
 Suvarnabhūm, kings of, 55  
*Symplocos racemosa*, 18
- T**ABAQAT I NAḠIRĪ, Bengal Geography  
 in the, 212*n*.  
 Tāj Khān, conqueror of Hijli, 225  
 Tājpur, 215, 239  
 Ta-ka-runt-bi, king of Pegu, 159  
 tāla or toddy wine, 5, 16  
 Taliāgarh, or Garhi, 215, 222  
 Tālibābād, 229  
 Talinga, 238  
 Tāndah, or Tara, in Bengal, 213*n*., 217, 223  
*tankah*, a coin, 347  
 tanka, or wood-apple liquor, 16  
 Tantras, quotations from the, 11  
 Tārabyā, king of Burma, 47  
*Tārīkh i Hamīdī*, a history, 234*n*.  
 Tavernier, 202  
 Tek-ka Meng, king of Pegu, 56  
 Tellez, History of Ethiopia, 200  
 Tenreiro (Antonio), Itinerary of, 190  
 Terry, E., 'Voyage to East India,' 242*n*.,  
 243*n*.  
 Thā-du-ka, king of Pegu, 56  
 Tha-lé-tsi, Fort of, 53  
 Thamala, founder of Pegu, 34  
 Tha-ma-na Radza, 56  
 Tha-min-Radza, king of Pegu, 57  
 Thārú tribe, 239  
 Théri Radza, king of Pegu, 56  
 Thiha Radza, the first king of Pegu, 55  
 Thiri Dhammā Thauka, 55  
 Thi-wa-rit, 55  
 Thomas, E., Initial Coinage of Bengal, 343 ff.  
 Thu-tsau-ha-di, 56  
 Thunguda Radza, 56  
 Tiparah, 235, 236, 238  
 Tirhut, 221, 255  
 Tishya, identified with Titha, 33  
 Titha, king of Pegu, 55  
 Titáliá River, 228  
 Todor Mall, 214  
 Toha-yá-dán A-thwá History of Pegu, 28
- Tolbort, T. W. H., Authorities for the His-  
 tory of the Portuguese in India, 193 ff.  
 Triboní, 214, 232, 244*n*.  
*Tripura*, vide Tiparah.  
 Tsam-bu-dipa, king of Pegu, 56  
 Tsan-da-la Radza, king of Pegu, 57  
 Tughril, Sultān Mughis, 238 [246  
 Tughril, 'Izz-ud-dín Tughán Khán, 237, 245,  
*tughril*, its meaning, 246*n*.  
 Tukaroi (Orisá), 224
- U**BA-DE-WA Meng, 55  
 Ulu-ma-la Radza, 57  
 Udaipur, in Tiparali, 237  
*Udesse*, 237, 244  
 U-din-na Radza, king of Pegu, 56  
 Udny, Mr. G., 209  
 Upadansa, 20  
 Upadarsa, 20  
 U-run-nata, king of Pegu, 56  
 Ut-tama Radza, king of Pegu, 56  
 Uttara, king of Pegu, 55
- V**AJAPEYA sacrifice, 22  
 Valentyn, François, his work, 202, 225, 226,  
 212*n*.  
 Van den Broucke, 242*n*.  
 Vārmi liquor, 6  
 Vasco de Gama, 193  
 Vasishthā, against wine, 4  
 Vijayachandra, son of Govindchandra, 317  
 Visvamitra, entertained with wine, 6
- W**A-RE'RU, king of Martaban, 41, 42,  
 weights, 345, 346  
 Westmacott, E. V., on a Bárbak Shāh In-  
 scription from Dínájpúr, 273; 209  
 Wi-dza-ya Kamna, 56  
 wine biscuits, or updansa, 20  
 wines, ingredients of different sorts of, 15, 18  
 wine, in the Rāmāyana, 8  
 wine, in the Mahābhārata, 5  
 Wimala, founder of Pegu, 34, 57  
 Wise, Dr. James, on Shāh Jalāl, 278; 209,  
 282, 284  
 witchcraft, 216, 279
- X**AVIER, St. Francis, 197
- Y**AJNAVALKYA against wine, 4  
 Yasovigraha, founder of a dynasty, 316  
 Yúsuf Shāh, Shams-ud-dín Abul Muzaffar,  
 of Bengal, 275
- Z**AFARABAD, 231*n*.  
 Zafar Khán, of Sunnārgaon, 256*n*.  
 Ziyá-ud-dín, Mír, of Máladah, 215*n*,  
 Ziyá-ulhaq, of Bihār, 303, 304.

# JOURNAL

OF THE

# ASIATIC SOCIETY.



Part I.—HISTORY, LITERATURE, &c.

No. I.—1873.

*Spirituuous Drinks in Ancient India.*—By BĀBU RA'JENDRALĀ'LA MITRA.

Sages and moralists have, in all ages and in every clime, expatiated in strong terms on the impropriety of indulgence in spirituous drinks, and some physiologists have recently discovered that such drinks do not possess any of the virtues which tradition has all along ascribed to them. We are told that they do not add to our strength, or power of digestion; they have no influence on the heart's action; they are powerless to increase the temperature of the body; they cannot help us to resist the chilling effect of cold; and are inert as aliments, failing alike in affording fuel for the lungs and material for the formation of the tissues. But neither the anathema of sages and moralists, nor the dicta of the professors of science, have anywhere sufficed to suppress their use. They prevail in some form or other in almost every part of the world; and those primitive races which have no knowledge of them, seize them with the greatest avidity the moment they find them; for, like tobacco, spirituous drinks have a peculiar charm which enables them, if not to defy, at least to hold their own alike against the deductions of science and the mandates of religion. In the eye of reason, voluntary inebriation may appear in the most offensive light; but there seems to be a craving in human nature to elevate the spirit above the dull routine of every-day existence, and to produce a temporary frenzy during which the cares and troubles of life are forgotten, and trains of delightful ideas fill the mind, which nothing can completely eradicate.

The history of Muhammadan civilization affords a most striking illustration of the truth of this assertion. None condemned the use of wine

more emphatically than the Prophet of Arabia, and yet there is no Muhammadan country where the consumption of wine is other than considerable, or as the great historian, Gibbon, has aptly expressed it, "the wines of Shiraz have always prevailed over the laws of Muhammad."

The annals of the Indo-Aryans yield a no less remarkable illustration. The earliest Bráhmaṇ settlers were a spirit-drinking race, and indulged largely both in Soma beer and strong spirits. To their gods the most acceptable and grateful offering was Soma beer, and wine or spirit (for in connexion with India the two words may be used synonymously, there never having been any such thing as pure wine,) was publicly sold in shops for the use of the community. In the *Rig Veda Sañhita* a hymn occurs which shows that wine was kept in leather bottles,\* and freely sold to all comers. The said wine was, likewise, offered to the gods, and the *Sautrámaṇi* and the *Vájapaya* rites, of which libations of strong arrack formed a prominent feature, were held in the highest esteem. Doubts have been entertained as to the nature of the Soma beverage, and people are not wanting who repudiate its intoxicating nature; but none will venture to deny that the *sura* of the *Sautrámaṇi* and the *Vájapaya* was other than arrack manufactured from rice-meal, and that will suffice to show that the Vedic Hindus did countenance the use of spirit. As to the Soma, if any reliance is to be placed in the directions given for its preparation, and on the Vedic descriptions of its effect on the gods, it is impossible to take it to have been other than a fermented intoxicating beverage. Of this, however, I shall treat lower down.

In the hot plains of India, over-indulgence in spirituous drinks, however gradually bore its evil consequences, and among the thoughtful a revulsion of feeling was the result. The later Vedas accordingly proposed a compromise, and, leaving the rites intact, prohibited the use of spirit for the gratification of the senses, in language very similar to Sydney Smith's "Think not, touch not, and taste not," saying "Wine is unfit to be drunk, unfit to be given, and unfit to be accepted,"† and denounced drinking to be heinous in the last degree, quite as bad as the murder of a Bráhmaṇ. The Smṛitis, following in their wake, included the sin of winebibbing among the five capital crimes or *mahápátakas*, and ordained the severest punishment against the offender.

It is said that the prohibition was first promulgated by S'ukrácharya, the high priest of the Asuras, who was disgusted by the remembrance of certain excesses to which he himself had been led by over-indulgence in strong drink. The *Mahábhárata* has euphuised the story in the 76th chapter

\* "I deposit the poison in the solar orb, like a leather bottle in the house of a vendor of spirits." Wilson's *Rig Veda*, II, p. 204.

† मद्यमपेयमदेयमपाङ्ग । ज्ञानिः ।

of its first book. According to it, Kacha, son of Vrihaspati, had become a pupil of S'ukráchárya with a view to obtain from him the charm of reviving dead men, which none else knew. The Asuras came to know of this, and, dreading lest the pupil should obtain and afterwards impart the great secret to the Devas, assassinated him, and mixed his ashes with the wine of his tutor, and thus transferred him to the bowels of S'ukráchárya. It happened, however, that during his pupilage Kacha had won the affection of Devayáni, the youthful and charming daughter of S'ukráchárya, and that lady insisted upon her father to restore the youth to her, threatening to commit suicide if the request was not complied with. S'ukra, unable to decline the favour to his daughter, repeated the charm, and anon, to his surprise, found the youth speaking from his own belly. The difficulty now was to bring the youth out, for this could not be accomplished without ripping open the abdomen of the tutor. S'ukrachárya thereupon taught the youth the great charm, and then allowed himself to be ripped open, and Kacha, in grateful acknowledgement of his restoration to life, revived his tutor. Now S'ukrachárya, seeing that it was the influence of drink which had made him insensibly swallow the ashes of a Bráhma, and that Bráhma his own pupil, prohibited the use of wine by Brahmans, "From this day forward," said he, "the Brahman, who through infatuation will drink arrack (*sura*) shall lose all his religious merit; that wretch will be guilty of the sin of killing Bráhmans, and be condemned in this as well as in a future world. Let all pious Bráhmans, mindful of their duty to their tutors, as also to the Devas and mankind in general, attend to this rule of conduct for Bráhmans ordained by me for all the regions of the universe."\*

S'ukrachárya was followed by Kṛishṇa, who also cursed the wine-bibber because his kith and kin, the Yádavas, proved the most intractable and unruly of drunkards.

The legends on which these prohibitions are founded may be, for ought we know, after-thoughts, designed to illustrate the heinousness of excessive indulgence, and to give weight to the prohibitions, by invoking the authority of great men against over-indulgence. But the fact remains unquestioned that, from an early period, the Hindus have denounced in their sacred writings the use of wine as sinful, and two of their greatest lawgivers, Manu†

\* यो ब्राह्मणोऽसुप्रभृतीह कश्चिन्नोहात्सुरां पात्यति मन्दबुद्धिः ।  
अपेत धर्मा ब्रह्मज्ञा चेव स स्थादक्षिन् लोके गर्हितः स्थात्यते च ॥  
मया चर्ता विप्रधर्मो ह्यधीर्ना मर्यादा वै स्थापिता सर्वलोके ।  
सन्नो विप्रा शुश्रुवांसो मुमुक्षा देवा लोकाश्चाप्यश्वत्थु सर्वे ॥

आदिपर्वणि ७६ अ० ।

† Manu XI, 91 to 96.

and Yajñavalkya\* held that the only expiation meet for a Brāhman who has polluted himself by drinking spirit, is suicide by a draught of spirit or water, or cow's urine, or milk in a boiling state, taken in a burning hot metal pot. Angira, Vas'istha and Paithinasi restricted the drink to boiling spirits alone.† Devala went a step further, and prescribed a draught of melted silver, copper or lead as the most appropriate.‡ Even in cases of accidental drinking of spirits through ignorance on the part of any of the three twice-born classes, nothing short of a repetition of the initial sacramentary rites, effecting a complete regeneration, is held sufficient to purge the sin.§ The Brāhman woman who transgresses this law, is denied access to the region of her husband, and is doomed to be born a slut, or a cow, or a vulture.|| Manus likewise provides for judicial cognisance of such offence by Brahmins, and ordains excommunication and branding on the forehead the figure of a bottle as the most appropriate punishment. "237. For violating the paternal bed, let the mark of a female part be impressed on the forehead with hot iron; for drinking spirits, a vintner's flag;¶ for stealing sacred gold, a dog's foot; for murdering a priest, the figure of a headless corpse.

"238. With none to eat with them, with none to sacrifice with them, with none to read with them, with none to be allied by marriage to them, abject and excluded from all social duties, let them wander over the earth.

"239. Branded with indelible marks, they shall be deserted by their paternal and maternal relations, treated by none with affection, received by none with respect: such is the ordinance of Manus." (IX.)

Even drinking of water kept in a wine bottle is held sinful, and various expiations are recommended for removing the sin.\*\*

\* सुराभ्युद्यतगोमुचपयसानग्निचक्षिभं ।

सुरापोन्यतमं पीत्वा मरणाच्छिविष्यति ॥

याज्ञवल्कीये १ अ० ।

† सुरापचारैर्वाससा चाग्निवर्णो सुरां पिबेत् ।

‡ सुरापाने ब्राह्मणे कथ्यतामसीसकानामन्यमतग्निक्वपं पीत्वा शरीरत्यागाम्युधते ।

§ अज्ञानात् सुरां पीत्वा रेतो विष्णुवसेव वा ।

पुनः संस्कारमर्चयित्वा च यो वर्णो द्विजातयः ॥

॥ पतिसोक्तं न सा याति ब्राह्मणी या सुरां पिबेत् ।

इदं च सा शूनी मृगशी शूकरी चोपजायते ॥

¶ The words are सुरापाने सुराध्वजः ॥ "For drinking, a liquor-flag," but as there is no flag known as peculiar to arrack, or arrack-sellers, commentators take the term *surādhvaja* to mean the particular kind of jar or flagon which was formerly used to hold liquor. What the shape of this jar was, I cannot ascertain

\*\* मद्यमाप्यस्थितं तोषं यदि कश्चिन् पिबेद् द्विजः ।

पक्षोद्भुजपरिष्वानां पक्षामस्य कुशस्य च ॥

एतेषामुदकं पीत्वा विरागेव विमुच्यति ।

Other authorities on law and religion are in no respect less stringent. And yet it would seem that at no time in their history have the Hindus as a nation altogether abstained from the use of spirituous drinks as a means of sensual gratification. Elders, anchorites, sages and learned men, forming the bulk of the priestly race, doubtless scrupulously abstained from them, as they do now in this and other countries ; and a good number of pious and respectable householders, and men of rank and position of the other classes followed their example, even as they do now ; but as they constituted but a fraction of the sum total of the community, their abstinence could not lead to abstinence on the part of the whole nation, or the bulk of it. There was probably also a considerable amount of hypocrisy, or outward expression of horror against wine on the part of the higher orders of the people, such as we know does prevail in the present day ; but Sanskrit literature, both ancient and modern, leaves no room for doubt as to wine having been very extensively used in this country at all times, and by all classes.

Manu, notwithstanding his stern anathema, found the public feeling or practice so strong against him as to be under the necessity of observing in one place that "there is no turpitude in drinking wine," but "a virtuous abstinence from it produces a signal compensation."\* Elsewhere he provides that the soldier and the merchant should not deal in spirituous liquors, leaving the S'ūdras to follow the trade at their pleasure.† The prohibition in the case of the soldier and the merchant refers to arrack only, so they were at liberty to take all other kinds of liquor, and accordingly the Mitāksharā comes to the conclusion that Brāhmanas alone have to abstain from all kinds of spirituous drinks, the Kshatriya and Vaishya from arrack or *paiskhi*, leaving the S'ūdras to indulge in whatever they liked.‡

Coming from the age of the Vedas to that of the Sūtras, I find that not only the soma and the surā of the Sañhitās and the Brāhmanas retained their firm hold on the people, but several new candidates for public favour appeared in the forms of *Mādhvika* or *mowā*, *Gaudī* or rum, *tāla* or toddy wine, and so on. They could not have been manufactured had there been no demand for them, and the conclusion becomes irresistible, that they were used to a considerable extent as a means of sensual gratification, though they seem never to have found a footing in religious ceremonies.

\* न मांसमद्ये दोषो न मद्ये न च मैथुने ।

प्रहतिरेषा भूतानां निवृत्तिस्तु मद्यापहता ॥

† X, 89.

‡ वैवर्षिकानामुत्पत्तिप्रवृत्तिरप्येवमिति । प्राकृतिकस्य तु मद्यमात्रप्रतिषेधोऽप्युत्पत्तिप्रवृत्त्येव । राजन्यवैश्यास्तु न कदाचिदपि मद्यादिमद्यप्रतिषेधः । शूद्रस्तु न कुराप्रतिषेधो नापि मद्यप्रतिषेधः । इति मिताक्षरा ।

Turning now to the Mahābhārata we have abundant evidence to show that most of the leading characters in that great epic were addicted to strong drinks, and no picnic or pleasure party was complete in which wine did not hold a prominent part. The extract from the *Harivaṃśa* published in the last volume of this Journal (p. 340 et seq.) affords a very graphic account of the manner in which such distinguished personages as Baladeva and Kṛishṇa and Arjuna indulged in drink in the company of their wives, sisters and daughters, and other extracts equally precise and full, might be easily multiplied, if needed. The description of Arjuna's picnic on the Raivata mountain given in the *Ādiparva*, offers a remarkable instance in point. Elsewhere Kṛishṇa and Arjuna are described as "having wine-inflamed eyes." "Both Kṛishṇa and Arjuna have been seen by me, both lying on a cot, or in their cars, besprinkled with sandal paste, and having their eyes reddened by mādhi and āsava."\* Sudeshnā, the queen of Maharājā Virāṭa, in the *Virāṭa Parva*, feeling thirsty, sends her maid, Draupadi, to her brother, Kichaka, to obtain from him a flagon of good wine for her use.† In the *Mausala Parva*, the Yādavas are described to have been so overcome by drink at the sea-side watering-place of Prabhāsa as to have destroyed each other in sheer drunkenness.

According to the Bhagavata Purāṇa, when questioned by his brother Yudhisthira as to how the Yādavas were doing, Arjuna is reported to have said—"O king, our friends, of whom you are inquiring, losing, through a Brāhman's curse on the house of our well-wishers, their senses by over-indulgence in Vārūni liquor, have, without recognising each other, exchanged blows and destroyed themselves. Now only four or five are left alive to tell the tale."‡

The Rāmāyaṇa also frequently notices wine and drinking. In one place no less a personage than the great sage, Viśvāmitra, who is the author of a considerable number of the hymns of the Rīg Veda, is said to have been entertained with *maireya* and *surā* by his host, Vasishṭha.§ Bhāradvāja

\* उभौ मध्यासवर्जिनौ उभौ चन्दनचर्चितौ ।

उभौ पर्यङ्कस्थिनौ दृष्टौ मे केशवार्जुनौ ॥

† पर्यङ्कं त्वं समुद्दिष्य सुरामग्नं चकार य ।

तत्रैनां प्रेषयिष्यामि सुराचारी तवान्निकं ॥

उत्तिष्ठ गच्छ सैरिग्निं कीचकस्य निवेशनं ।

पानमानय कक्षाणि पिपासा मां प्रवाचते ॥

‡ राजकुलानुषङ्गानां दुष्टदा नः दुष्टपुरे ।

विप्रप्रापविमूढानां निज्जतां मुहिभिर्मियः ॥

वाचसीं मदिरां पीत्वा मदोन्मथितचेतसां ।

सज्जनतानिवाभ्यान्व चतुःषष्ठावशेषिताः ॥

वीरकामवते १ कम् १५ अध्यायः ।

another great sage, offered wine to Bharata and his soldiers when they spent a night under his hospitable roof. "O ye drinkers of spirits," said the sage, "drink spirituous liquors; O ye hungry, eat; fill yourselves with frumenty and various kinds of juicy meats.\*" This sage welcomed Ráma by slaughtering "the fatted calf," but he is not reported to have offered the exile any liquor for his regalement. Two passages, however, occur in the second book of the Rámáyana which afford the most conclusive proof of wine having been extensively used, and held in considerable estimation as a favourite drink in former days. The practice of making vows at times of danger and misfortune to offer something choice to the gods, was universal in former days, and is common enough now in most parts of the world. The nature of the offering doubtless differs under different circumstances; but the offering is made all the same. The candles for the Madonna of Roman Catholic countries is in Bengal represented by milk, or frumenty, or richer offerings, and rarely is a child sick in the house, or a cow suffering from the pains of parturition, for which some milk is not vowed to the lares and penates. Sitá, the model of feminine grace and virtue, was not above this custom, and when crossing the Ganges in her way to the wilderness of the south, is said to have made a similar vow; but instead of mentioning milk or frumenty, she pledged herself to offer a plentiful supply of arrack. Addressing the river, she said; "Be merciful to us, O goddess, and I shall, on my return home, worship thee with a thousand jars of arrack and dishes of cooked flesh-meat.†" When crossing the Yamuná she said, "Be thou auspicious, O goddess; I am crossing thee. When my husband has accomplished his vow, I shall worship thee with a thousand head of cattle and a hundred jars of arrack."‡ Again, Bharata, returning from his ineffectual mission to bring back Ráma, mourns the lost glories of the capital: "No longer the exhilarating aroma of arrack, nor the enchanting scent of garlands, of sandalwood, and of agallochum now wafts through the city."§ After these, the presence of wine in the palaces of Rávana and Sugriva, and the greatest glory of the streets of Kiskindá having been the aroma of arrack|| are not matters of wonder, seeing that those persons were

\* Rámáyana, Carey's edition, III, p. 297.

† दुराघटसहस्रेण मांसभूतोदनेन च ।

यस्यै त्वां प्रीयतां देवि पुरीं पुनरपामता ॥

‡ सखि देवि तरामि त्वां पारयन्के पतिव्रतम् ।

यस्यै त्वां मेघसहस्रेण दुराघटभ्रतेन च ॥

§ वावरोमदग्न्थश्च भास्वग्न्थश्च सूर्योदितः ।

चन्दनागुदग्न्थश्च न प्रयाति समन्ततः ॥

११४ अ० १० श्लो० ।

|| चन्दनागुदपद्माभ्यां गन्धैः सुरभिर्गन्धिभिः ।

मेरुयाणां भङ्गुनाश्च सम्राटतमहापद्याम् ॥

किष्किन्वाकाश्च ११ अ० ।



not included in the pale of Hinduism and the city belonged to a race of monkeys. ●

Buddhism must have contributed much to check the spread of drunkenness in India, as it did in putting down the consumption of flesh-meat, but it never was equal to the task of suppressing it. The Jātakas and Avadānas abound in stories of drunkenness, and among the sculptures of Sānchi, several ladies of high rank, standing in the verandahs of the upper storeys of their mansions to behold religious processions in the street, are represented with attendants holding forth tazzas and flagons, which evidently were intended to contain something more potent than water or sharbat. In three love-scenes, the lovers are represented offering overflowing goblets to their mistresses, certainly not with a view to smother the flames of Cupid with a cooling draught. In a Buddhist drama, entitled *Nagānanda*, lately translated into English by Mr. Ralph Boyd, a scene occurs, the plot of which depends upon the vagaries of a drunkard, who had for his lady-love a maid of honor of the queen.

In the time of Kālidāsa drinking seems to have been very common, for we find in the *Sakuntalā*, the Superintendent of Police, who was no other than the king's brother-in-law, proposing, like an English policeman, or cabby, to spend the present offered him by the fisherman who recovered the lost ring, at the nearest grog shop.

"FISHERMAN.—Here's half the money for you, my masters. It will serve to purchase the flowers you spoke of, if not to buy me your goodwill.

"JA'NUKA.—Well, now, that's just as it should be.

"SUPERINTENDENT.—My good fisherman, you are an excellent fellow, and I begin to feel quite a regard for you. Let us seal our first friendship over a glass of good liquor. Come along to the next wineshop, and we'll drink your health."\*

In his graphic description of the triumphal march of Raghu, Kālidāsa specially notices drinking-booths set up by the soldiery at Rājamundri, to drink the famous cocoa-nut liquor of the place.† The proper way to drink it was in betel leaf cups. So profusely was this liquor partaken of, that, in the hyperbolical language of the poet, the water of the Cauvery was tainted by the smell.‡ In a subsequent part of the description, the same soldiery appear to have in Persia drunk grape-wine, seated on leather

\* Williams's *Sakuntala*, p. 153.

† ताम्बूलीनां द्रव्यस्य रक्षिता पात्रभूयः।

कारिकेच्छासर्वं बोधाः शान्तवत् पपुः शः ॥ ४।४२ ॥

‡ स सम्यपरिभागेन मज्जानसुमन्विता ।

कावरीं सरितां पत्युः शङ्कनीयानिवाकरोत ॥ ४।४५ ॥

cushions spread under umbrageous vineyards.\* A passage in the *Kumára Sambhava*, of the same author, extols a crystal palace on the Himálaya as so exquisite as to be best adapted for a drinking hall.† Drinking must have been common in high circles to justify this comparison. Elsewhere drinking halls, as specially reserved apartments in a palace, are frequently mentioned.

Kálidása is also lavish in his references to drinking by women of quality. In the *Raghuvaṃśa*, he makes Aja bemoan the loss of his wife, Indumati, by this apostrophe: "How will you, dear one of wine-reddened eye, who have quaffed delightful liquor from my mouth, drink the mist-befouled water which I offer with my tears."‡ Adverting to a practice of making *Vakula* trees (*Memusops elengi*) flower by gargling wine on them, the same author says: "Sprinkled over with arrack from charming faces, the blossoms partook of the character of the liquor."§ Again: "Liquors, which excite delightful recreation, overcome by their bouquet the aroma of *vakula* flowers, never break the current of enjoyment, and are friendly to Cupid, the ladies drink with their husbands."|| Again, "The ladies in private drank highly exhilarating liquor from the mouth of *Agnivarna*, and he on his turn blossomed like the *vakula* by drinking of arrack from their mouths."¶

In the *Kumára Sambhava*, Rati, mourning the loss of her lord Cupid, says:—Rice liquor, which causes the reddened eyes to roll, and speech to get

\* विनयन्ते स्म तद् योधा मधुभिर्विजययन्तम् ।

आसीर्णाजिनरत्नासु द्राक्षावस्तयभूमिषु ॥ ४ । १५ ॥

† यच्च स्फटिकचर्म्येषु नक्तमापानभूमिषु ।

ज्योतिषां प्रतिविम्बानि प्राप्नुवन्त्युपहारताम् ॥

१ सर्गे ४९ श्लोकः ।

‡ मदिराणि ! मदाननार्पितं मधु पीत्वा रसवत् कथं नु मे ।

अनुपास्तसि बाष्पदूषितं परलोकोपगतं जलाञ्जलिम् ॥

१८ सर्गे १८ श्लोकः ।

§ सुवदनावदनासवसम्भृतसदनुवादिगुणः कुसुमोज्ज्वलः ।

मधुकरैरकरोन्मधुलोपुपैर्वकुलमाकुलमायतपङ्क्तिभिः ॥

१८ सर्गे १० श्लोकः ।

|| स्फुलितविधमवन्मविचक्षणं सुरभिन्मपराजितकोसरम् ।

पतिषु निर्विचिह्नमभुजङ्गनाः स्मरसं रसकण्ठमवर्जितम् ॥

१८ सर्गे ११ श्लोकः ।

¶ सातिरेकमदकारणं रसलेन दत्तमभिलेपुर्द्वजनाः ।

ताभिरप्युपहृतं मुखासवं सोऽपिबद्धकुलमुज्ज्वलोदरः ॥

१८ सर्गे ११ श्लोकः ।

disjointed at every step, has, in thy absence, become a torture to loving women."\*

In the 7th book of that work, when describing Siva's approach to the palace of Himaláya, the poet says that "the faces of the ladies who rushed to the windows in great haste and with half finished toilettes, to behold the procession, evolved the odour of the arrack they had drunk, and their dark eyes appeared like black bees on charming lotuses."†

Mágha, in the *Sisupálabhadka* describing Baladeva, says "when he spoke, the aroma of liquor which had obtained sweetness by lodging in the mouth of Revatí, issued from his mouth."‡

The Puráns abound in descriptions of wine and drinking, and, though the object of many of them is to condemn the use of wine, the inference is clear, that there was a widespread malady which they proposed to overcome. In some instances, moreover, the object was not reprobation, but mere description, and no less an authority than the Bhágavata Puráṇa enjoins the use of spirit by Bráhmans at the *Sautrámaṇi* rite, So does Vrihaspati, the high priest of the gods, whose Sañhitá is a standard authority on law,§ In the *Maṛkaṇḍeya Puráṇa*, the great goddess Durgá is represented as particularly addicted to strong drinks. Kuvera serves her with overflowing goblets of strong liquor, and she drinks and drinks till her eyes become flaming red, and she bursts out in wild laughter. When girding herself to prepare for her combat with the fierce demon Mahisa, she says: "Roar, roar, you fool, for a moment only, till I finish my drinking."||

Other instances may be quoted *ad libitum*, but they are not wanted. I shall abstain also from extracting more passages from the poetical literature

\* मयनान्यदवानि मूर्खस्य वचनानि सखस्य च पदे पदे ।

वचति जयि नावलीसदः प्रमदानामधुना विडम्बना ॥

४ सर्गे १९ श्लोकः ।

† तावां मुखैरासवमन्त्रमर्षीभान्नारायान्द्रक्तपुष्पलानाम् ।

विहोहनेवधनरैर्गवाचाः सखस्यनाभरणा दूरावन् ॥

७ सर्गे १९ श्लोकः ।

‡ ककुप्तिक्त्वावज्ञानवैरासखत्वाविवासया ।

मुहानोदं मदिरया क्षतानुवाचमुदमन् ॥

सायस्य १ सर्गे १० श्लोकः ।

§ शैषामस्यां तस्मा मयं भुतो मध्यमुदाहृतं ।

Apud Viramītrādaya.

|| ददावग्रन्थं क्षरया पानपात्रं वनाधिपः ।

ततः मुक्ता कमलानां चण्डिका पानमुदमन् ।

ययौ पुनः पुनश्चैव जडाचारकलोचना ॥

तत्रैव तत्रैव मूढं मयं वावत् पिबाम्यहं ।

of the last fifteen or sixteen hundred years to show how frequently reference are made to drinking among the higher classes of the community. But I cannot omit noticing the Tantras, which afford the most indubitable proofs of a strong attachment on the part of a large section of the Hindus to over-indulgence in spirituous drinks. These works profess to be revelations made by S'iva to his consort Párvati, and constitute the life and soul of the modern system of Hinduism. In the way of religious rites, nothing is done in the present day, and nothing has been for the last fifteen hundred years in Bengal, which does not, or did not, borrow its main characteristics from the Tantras. They govern alike the conscience of the followers of S'iva, the worshippers of S'akti, and the adorers of Vishnu. In the present day, some few ceremonies are called Vedic, and Vedic mantras are used in a great many others; but in most instances, the mantras used have been transmitted through a Tántric medium, and it may be said with very little exaggeration that the life of a Hindu from birth to burning-ground is one eternal bondage to the ordinances of the Tantras. Doubtless the Tantras are of various kinds, some Vaishnavite, others S'ivite, and others designed for the glorification of S'akti, or the female energy, and the last two classes of works are described by the Vaishnavas, and very justly, as *sanmohini* or "delusive," designed with a view to mislead mankind in this sinful iron age; but even the most bigoted Vaishnava dares not question their character as revelations by S'iva, and most faithfully owns his allegiance to such Tantras as are of a Vaishnavite tendency. The S'ivite and S'ákta Tantras are, however, much more numerous, and their followers in the present day may be reckoned by hundreds of thousands. Before the advent of Chaitanya, four hundred years ago, their influence was much greater; and the great bulk of the Hindus professed the faith inculcated in those works. The doctrine of equality which Chaitanya and his successors preached, won over over to their side the major portion of the lower orders of the people, and the Vaishnavas, therefore, now prevail in Bengal; but the Brahmans could never brook the idea of owning equality with low caste men, so most of them stuck to, and still follow, the doctrines of S'aiva or S'ákta worship, and the Tantras which inculcate them give free liberty to their votaries to indulge in drinking spirits. The S'ákta Tantras go further, and insist upon the use of wine as an element of devotion. According to them no worship of the Devi can be complete which is not celebrated with the five great essentials, "fish, flesh, wine, fried grain, and female society," technically called the five Ms, from the circumstance of the initial letters of their Sanskrit names being M. To describe the details of the worship would be so shocking that I cannot venture upon the task. Suffice it to say, that the Kaulas, who are the most ardent followers of the S'ákta Tantras, celebrate their rites at midnight in a closed room, where they sit in a circle round a jar of country arrack, one or more young women of a lewd character being in the

company; they “drink, drink, and drink until they fall down in utter helplessness, then rising again they drink, in the hope of never having a second birth.”\* In such circles (*Bhairavi chakra*) Kaulas of all castes are admissible, for, say the Tantras, when once in the mystic circle, all castes are superior to Bráhmans, though on coming out of it, they revert to their respective ranks in civil society.† It is true that this “left-handed” or secret worship (*vámachára*) is observed by a few of the most ardent votaries of the sect, at long intervals; and the Tantras inculcate absolute secrecy in its performance, and disclosure is condemned as calculated to frustrate all its merits, and prove highly disreputable; but the use of wine is enjoined at the ordinary daily prayers or *sandhyás*, and on particular occasions it is a *sine qua non*. I knew a highly respectable widow lady, connected with one of the most distinguished families in Calcutta, who belonged to the Kaula sect, and had survived the 75th anniversary of her birthday, who never said her prayers, (and she did so regularly every morning and evening) without touching the point of her tongue with a tooth-pick dipped in a phial of arrack, and sprinkling a few drops of the liquor on the flowers which she offered to her god. I doubt very much if she had ever drunk a wine-glassful of arrack at once in all her life, and certain it is that she never had any idea of the pleasures of drinking; but, as a faithful Kaula, she felt herself in duty bound to observe the mandates of her religion with the greatest scrupulousness. That thousands of others do so, I have every reason to believe. In some parts of Bengal, where arrack is not easily accessible, such female votaries prepare a substitute by dropping the milk of a cocoa-nut in a bell-metal pot, or milk in a copper vessel, and drink a few drops of the same. Men are, however, not so abstemious, and the Tantras ordain a daily allowance of five cupsful, the cup being so made as to contain five *tolás*, or two ounces,‡ i. e. they are permitted to take ten ounces or about a pint of arrack daily.

The most appropriate way of drinking liquor is in the mystic circle above noticed; but as this cannot be got up every day, the devotee takes the bulk of his potation alone after the evening prayer. He is also at liberty to drink wherever he likes, and in whatever company chance may

\* पीला पीला पुनः पीला पुनः पतति भूतले ।  
 उत्थाय च पुनः पीला पुनर्जन्म न विद्यते ॥  
 महाविवाहकम् ।

† चायता भैरवीचक्रे सर्वे यथाः द्विजोत्तमाः ।  
 निर्जना भैरवीचक्रात् सर्वे यथाः श्वक् श्वक् ॥

‡ पादपार्श्वं प्रकुर्वीत नक्षत्रतोषकादिभिः ।

throw in his way, provided he faithfully observes one condition, and that is, never to drink without neutralising the curse of S'ukráchārya and purifying the drink. This is done by drawing a triangular figure on the ground with the right index finger dipped in liquor, placing the flagon thereon, and repeating over it three mantras which say—(1) “Om ! The great Brahma is one alone ; verily, he is both material and immaterial. Through him I destroy the sin of Bráhmanicide which has originated in (the murder of) Kacha (son of Vrihaspati. (2) Om ! O goddess, dweller in the orb of the sun, born in the abode of waters, and consisting of the sacred mantra of Amá, remove the curse of S'ukráchārya. (3) Om ! If the Prapava be the source of the Vedas, and essentially and solely the felicity of Brahma, by it, the truth, O goddess, cast away the sin of killing Bráhmans.\*” After repeating the mantras, the word *vañs'a* is to be muttered several times, and then repeating his own especially *vijamantra*, the votary should meditate on the form of his favourite divinity, which is generally a manifestation of Káli, and then on that of S'iva who is described as “blood red in complexion, four-handed, three-eyed, benign, beneficent, bearing a mass of matted hair on his head, a necklace of snakes round his neck, a diminutive tomtom, a skull, a club, and a noose in his hands, and arrayed in a tiger skin.”† Ten repetitions of the *gayatri* after this and of the words *hum* and *phaṭ* effect the complete purification of the grog, and the neutralization of the curse. At the formal mystic circle, several other mantras are repeated, and some formulæ gone through ; but they are not absolutely necessary for the ordinary every day ritual, or for the purification of the drink. In practice the ritual above set forth, or a modification of it, including of course the three important mantras, does not take much time, and I have seen it completed in two or three minutes. But whether an epitome is adopted, or the whole ritual be gone through, some ceremony is imperatively necessary, for the Kaula who drinks wine without purifying it, becomes a criminal of the worst class. According to the

\* ॐ एकमेव परं ब्रह्म स्थूलसूक्ष्मसं भुवं ।  
 कषोड्गवां ब्रह्मचर्या तेन ते नाश्रयाम्यहं ॥  
 ॐ सूक्ष्ममण्डलसंभूते वरकालयसम्भवे ।  
 क्षमावीजमये देवि शुक्राभापाद्विसुचतां ॥  
 ॐ देवानां प्रणवो वीजं ब्रह्मानन्दमयं यदि ।  
 तेन सत्येन ते देवि ब्रह्मचर्या व्यपोषतु ॥  
 कैवल्यतन्त्रे ९ पटलः ।

† रक्तवर्णे चतुर्वैजं चित्रे च वरदं शिवं ।  
 जटाजूटधरं देवं बाहुकीकण्ठभूषितं ॥  
 उमवच्च कपालाच्च मुकुटं पाशमुत्तमं ।  
 शारिणं तं यजेदेवं व्याघ्रचर्मोत्तरं शिवं ॥  
 कैवल्यतन्त्रे ९ पटलः ।

*Utpatti Tantra*, "the Brāhman who drinks unpurified liquor is guilty of killing a Brāhman ; drinking purified arrack he becomes as pure as a flaming fire. At the Sautrāmapi rite and in the Kaula circle, a Brāhman should always drink arrack ; but by drinking elsewhere for the mere gratification of his senses, he loses his Brāhmanhood.\*

The *Mātrikā-bheda Tantra* is most eloquent in praise of drinking. It makes S'iva address his consort thus : " O sweet-speaking goddess, the salvation of Brāhmans depends on drinking wine. I impart to you a truth, a great truth, O mountain-born, (when I say) that the Brāhman who attends to drinking and its accompaniments forthwith becomes a S'iva. Even as water mixes with water, and metal amalgamates with metal ; even as the confined space in a pot merges into the great body of surrounding space on the destruction of the confining vessel, and air commingles with air, so does, dear one, a Brāhman melt in Brahma, the great soul. There is not the least doubt about this, O mountain-born. Similitude with the divinity, and other forms of liberation are designed for Kshatriyas and others ; but true knowledge can never be acquired, goddess dear, without drinking wine ; therefore should Brāhmans always drink. No one becomes a Brāhman by repeating the gāyatri, the mother of the Vedas ; he is called a Brāhman only when he has a knowledge of Brahma. The ambrosia of the gods is their Brahma, and on earth it is arrack ; and because one attains the character of a god (*suratva*), therefore is arrack called *surā*.†" The work, nevertheless, will admit of no

\* अस्मत्कृतां सुरां पीत्वा ब्राह्मणो ब्राह्मण भवेत् ।  
 संस्क्रतां सुरां पीत्वा ब्राह्मणो ब्रह्मदम्बिवत् ॥  
 सौषामर्षां कुशाचारे ब्राह्मणः प्रपिबेत् सुरां ।  
 अन्यत्र कामतः पीत्वा ब्राह्मणोऽपि जीयते ॥

† ब्राह्मणस्य मन्त्रमोक्षं मद्यपाने प्रियवदे ।  
 ब्राह्मणः परमेष्ठानि यदि पानादिर्न चरेत् ॥  
 तत्तृणान् शिवरूपोऽसौ सत्यं सत्यं हि ब्रैह्मणे ।  
 तोये तोयं यथा क्षीरं तैजसं तैजसे यथा ॥  
 वदे अग्ने यथाकाशं तापो वायुर्गन्धाग्निमे ।  
 तथैव मद्यपानेन ब्राह्मणो ब्राह्मणि प्रिये ॥  
 क्षीयते नात्र संदेहः परमात्मनि ब्रैह्मणे ।  
 सायुष्यादि मन्त्रमोक्षं निवृत्तं क्षयिष्यादिषु ॥  
 मद्यपानं विना देवि तज्ज्ञानं न लभ्यते ।  
 अतएव हि विप्रसु मद्यपानं समाचरेत् ॥  
 वेदमाता अपेक्षैव ब्राह्मणा न हि ब्रैह्मणे ।  
 ब्राह्मज्ञानं यदा देवि तदा ब्राह्मण उच्यते ॥  
 देवानामनन्तं ब्रह्म तदेव सौमिकी सुरा ।  
 सुरात्तं भोजनानेव सुरा नेव प्रकीर्तिता ॥

drinking without the purification aforesaid. "The three mantras for the neutralization of the curse of the Bráhmaṇ (S'ukrácharya) should always be repeated. Then only does arrack become full of Brahma. Even as a fire flames up when clarified butter is poured on it, so does arrack become the giver of salvation on the neutralization of the curse. Therefore should Bráhmans always drink (after purifying his grog). Such a drinker, is a true Bráhmaṇ ; he is proficient in the Vedas ; he is truly an Agnihotri ; he is thoroughly initiated ; what more can I say, O noblest of goddesses, when I add that he rises above the three qualities (inherent in matter). This is the true path to salvation ; but it should be kept a secret from bestial people (*páśu*, men who do not drink wine), for disclosure leads to want of success, and is highly disreputable.\*"

The *Kámikhyá Tantra* speaks very much in the same vein. "Whoever," it says, "after being initiated in the salvation-giving mantra of Káliká, fails to drink wine, is a fallen man in this iron age. He has no right to the performance of Vedic and Tántric ceremonies ; he is called unbráhmaṇ, ignorant as an elephant ; and whatever oblations he offers his manes, becomes as impure as the urine of a dog. Having obtained the mantra of Káli or Tári, he who conducts not himself as a Víra (or hero, i. e., drinker of wine), unmistakably acquires in his person the degradation of a S'údra."†

It will be naturally supposed that those who wrote the above panegyric must have had various kinds of liquor for their use ; and the S'ástras afford the most convincing proof on this head. Pulastya, an ancient sage and author of one of the original Smritis, enumerates twelve different kinds of

\* वविरारोपमाचेण वड्ढिदीप्तिो यथा भवेत् ।  
 आपमोषममाचेण सुरा मुक्तिप्रदायिनी ॥  
 अतएव हि देवेभि ब्राह्मणः पानमाचरेत् ।  
 स ब्राह्मणः स देवद्व्यः सोऽग्निहोत्री स दीक्षितः ॥  
 वड्ढ किं कथ्यते देवि स एव निर्गुणात्मकः ।  
 मुक्तिमार्गमिह देवि मोक्षार्थं पश्यसङ्कटे ।  
 प्रकाशान् सिद्धिदानिः श्लाघिन्दनीयो न चान्यथा ॥

† काशिका तारिणी दीक्षां मृषीणा मद्यसेवने ।  
 न करोति करो यस्तु स कसौ धितो भवेत् ॥  
 वैदिके तान्त्रिके चैव अपहोमवद्विस्मृता ।  
 ब्राह्मणः स एवोक्तः स एव वक्षिमुखकः ॥  
 मृनीमूषसमं तस्य तर्पणं यत् पिबन्मयि ।  
 काशी तारामनुप्राप्य वीराचारं करोति न ।  
 मृज्जत् तच्छरीरेव ब्राह्मणः स न चान्यथा ॥

कामाचारवन्ते ५ पदम् ॥



liquor besides the soma beer, which is not usually reckoned under the head of *madya*, and his successors have added largely to the list. The twelve principal liquors of this sage are 1, *pánasa*, or jack liquor; 2, *dráksha*, or grape liquor; 3, *mádhuka*, or honey liquor; 4, *khárijjura*, or date liquor; 5, *tála*, or palm liquor; 6, *aikshava*, or cane liquor; 7, *mádhvika*, or mowa liquor; 8, *saira*, long pepper liquor; 9, *arishṭa*, or soap-berry liquor; 10, *maireya*, or rum; 11, *nárikelaja*, or cocoa-nut liquor; 12, *surd*, or arrack, otherwise called *váruṇi* or *paishṭi*.\* This verse, as quoted in the *S'abda-kalpadruma*, gives *śāñka*, or wood apple liquor, and the Vishṇu Sanhitá *koli* or jujube liquor in lieu of *Saira*.

The mode of preparing these liquors is briefly described in the *Matsya-s'ukta Tantra*. It says, "Place unripe jack, mango, and plums, in a jar, and pour on it daily a quantity of unboiled milk, and add some flesh meat; put therein hemp leaves and sweet lime on alternate days, and when duly fermented, distil, and this is jack wine."†

For the 2nd, the grape juice is to be fermented with curds, honey and ghi, distilled in the usual way, and flavoured with manjit, and chiretta.‡ This is of course brandy-bitter, pure and simple, dyed with manjit instead of burnt sugar. The 3rd has honey for its principal ingredient, and with it is to be associated *Viḍaṅga* (a bitter drug), salep misri, long pepper, and salt.§ The 4th has ripe dates for its basis, and with it is mixed jack fruit, ginger and the juice of the soma vine.|| The 5th is made with the

- \* पानसं द्राक्षमाधूकं शार्करं तालमेक्षवं ।  
 माध्वीकं चैरमाटीष्टं मैरेयं गरिकेलजं ॥  
 समानानि विजानीयात् मद्यानेकादशैव तु ।  
 द्वादशसु सुरामयं सर्वेषामयमं स्मृतं ॥
- † अपक्वं पनसञ्ज्ञेयं चाक्षयं वदरं तथा ।  
 श्यापयित्वा घटे नित्यं दद्यादात्मपयःफलम् ॥  
 नैलोत्पलविजयाञ्ज्ञेयं मातुलजं तथैव च ।  
 समेऽहनि ततो दद्यात् सव्यानात् सप्तमीरितम् ॥
- ‡ दधिमधुघृतश्चापि मस्तिष्ठं तिप्तर्हं तथा ।  
 अनुपाने तु देवेभिः द्राक्ष-मयं सुनिश्चितं ॥
- § निडङ्गं शाल्वो मूत्रं ।  
 मधुना च च संश्राप्य श्रेवे पार्कं समाचरेत् ।  
 पिप्यली कवचं दत्त्वा मधुना मद्यनीरितं ॥
- || पानसं पक्वशार्करं चार्द्रं सोमलतारसं ।  
 श्लोक्षत्वाग्निस्व्यानात् शर्करं मद्यनीरितम् ॥

ripe palm fruit spiced with danti (*Croton polyandrum*) and the leaves of the *kakubha* plant.\* The 6th has sugar-cane for its basis, and black pepper, plums, curds, and salt for adjuncts.† The 7th is made of the blossoms of the *Bassia latifolia*, mixed with sugar and ripe bel fruit.‡ The 8th is made of molasses and long pepper. The Tantra follows the reading of Rájá Rádhá-kánta Deva, and has *řanka* instead of *saira*, and it should be made, according to it, with the root of the *Asparagus racemosus*, the root of the wood-apple-tree, a drug called *laksman*, lotus flowers, and honey.§ The 9th, according to the reading of the Mitákshará, is a liquor made from soap-berry plant with molasses, but according to the Tantra of the root of the ægle marmelos, plums, and sugar.|| The 10th of the above list occurs in the Tantra under the name of *gaudi*, or rum, made from molasses, the adjuncts during fermentation being curds, hemp leaves, and a drug called *karikaná*.¶ The 11th is made of the milk, or toddy, of the cocoa-nut, mixed with plantains, ripe emblic myrobolans, and the drug Indrajihvá.\*\* The 12th has half-boiled rice, barley, black pepper, lemon juice, ginger, and hot water for its ingredients. The rice and barley are to be digested in hot water for two days, then boiled, then spiced with the other ingredients, and allowed to ferment thoroughly, and lastly distilled.††

\* पक्वतालं दन्तिशार्कं ककुभञ्च तथैव च ।  
एतैरेव सुसम्भानात् तालमद्यं प्रकीर्तितम् ॥

† इक्षुदण्डं मरीचञ्च वदरञ्च तथा दधि ।  
श्रेष्ठे तु लवणं दत्त्वा इक्षुमद्यं प्रकीर्तितम् ॥

‡ नवं मधु तथा विल्वं पक्वं शर्करया सञ्च ।  
सम्भानाज्जायते मद्यं माध्वीकं शरतो रसं ॥

§ शतावरी टङ्कमूलं लवणं पद्ममेव च ।  
मधुना सञ्च सम्भानात् टङ्कमाध्वीकमोरितं ॥

|| मालूरमूलं वदरी शर्करा च तथैव च ।  
एषामेकञ्च सम्भानान् सैरेयं मद्यमीरितं ॥

¶ दधि चैलोक्यविजया तथैव च करीकषा ।  
गुग्गुलुञ्च सम्भानात् मौडीमद्यं प्रकीर्तितम् ॥

\*\* इन्द्रजिह्वा पक्वधात्री मारिकेलजलं तथा ।  
कदलीफलसम्भानात् मद्यं तस्मारिकेलजलं ॥

†† अक्षुलीमर्षसिद्धाक्षमुष्णोदकसमन्वितम् ।  
वक्रौ सन्नापयेत् किञ्चित् स्थापयित्वा दिनद्वयम् ॥  
श्रेष्ठेऽग्निं तु सम्प्राप्ते जीवर्णं तत्र निःक्षिपेत् ।  
शुद्धवेरं मरीचञ्च मातुलुङ्गं तथैव च ॥  
एतेषामेव सम्भानान् पैडोमद्यं प्रकीर्तितम् ॥

The arrack described in the Vedas was somewhat differently prepared from the way above detailed, as will be seen in the sequel. All the other liquors noticed in Sanskrit works were, likewise, first fermented, and then distilled; none manufactured, as European wines are, by mere fermentation. In fact, they are all spirits differently flavoured with various kinds of spices, fruits, and herbs, to suit different tastes, and not wines; and the word wine has been used in this paper in its secondary sense of intoxicating liquor.

A liquor flavoured with aniseed has enjoyed considerable celebrity in India for a long time. It is said that a celebrated Tāntric paṇḍit of Nadiā, who bore the title of *Āgamavāgis'a*, or "the Lord of the Science of Āgama," was particularly fond of it, and used to take a *loṭā* full of it every day. People, suspecting him of this weakness, watched him one evening when he was returning from his vesper prayers at the river side. He was seen to come out on the sly from a grog-shop with his water-pot filled with aniseed arrack, and taxed by a large crowd for conduct so disreputable in a Brāhman of his learning and sanctity. He denied the charge, and placed the *loṭā* before his accusers, when lo! the pot appeared to contain milk. "A miracle, a miracle," cried the crowd, and the paṇḍit, instead of being degraded, was canonised as the most favourite son of the Devī; the fact being, that the wily toper knew well that aniseed liquor mixed with a little water becomes milky, and had taken the precaution to doctor it so with a view to provide against possible contingencies.

Among the many omissions in Pulastya's list, the Tānka, the Koli, and the Kādamvari appear the most prominent. The name of the first is met with largely in the Tantras. The second is of rare occurrence. The last was a favourite drink of Baladeva, and was at one time held in high repute. In medical works, various other kinds of liquor are also mentioned, mostly as aphrodisiacs, but some as medicinal. The following enjoys a high repute as an invigorating tonic. I quote a passage describing it as it is the only one in which an account is given (imperfect as it is) of the still used for distillation. "Take of fresh molasses 100 palas,\* water 30 palas, and mix them in an earthen vessel. Take of Vāvari bark (*Cassia arabica*?) and jujube bark five *prasthas* each, (a *prastha* is equal to 128 tolās), a few betel-nuts, 32 tolās of lodhra (*Symplocos racemosa*), and two palas of ginger. Dilute the molasses mixture in water, add to it successively the ginger, the Vavari bark, and the jujube bark, mix well, then cover the vessel, and lay it by for three days. Then add the betel-nuts and powdered lodhra, recover the vessel, tie down the cover, lute it, and lay it by for twenty days. Take the apparatus called *mayūra yantra*, a strong earthen vessel of the shape of a peacock, place it on a hearth over a slow fire, pour into it the fermented mixture, and add thereto half a pala each of powdered betel-nut, sailabolaka,

\* A pala, according to some, is equal to 4 tolās; according to others, eight tolās.

deodar wood, cloves, padmaka (a drug), leaves of the *Andropogon muricatum* (a fragrant grass), sandal wood, *Anithum sowa*, *Ligusticum ajwana*, black pepper, the white and the black cummin seed, carraway, jatámansi, nutmegs, *Ocyprus rotundus* (*muthá*), grinthi parni (a drug), dried ginger, methi (a spice), and small cardamums. Now cover the vessel with two upturned chatties, attach thereto two pipes, and carefully distil the liquor. This wine should be drunk daily. It promotes the secretion of the constituents of the body, and is invigorating.”\*

Although all the various Indian liquors are essentially the same, *viz.*, rum, differing only in being differently flavoured, in the eye of the Hindu law, the liquors made from molasses, mowa, and rice are held to be more offensive than the others, and the punishment for drinking them, more severe.

The flavouring ingredients used in the preparation of these liquors, it is said, materially altered their virtues, and medical works prescribe different liquors for different complaints. For ordinary use the rum from molasses is described to be the most healthful in the dewy season (October and November), the arrack from paddy in the cold and rainy seasons; and the mowa liquor in spring, summer, and autumn. Connoisseurs were also formerly particular as to the age of their liquor, and the older the liquor, the better was it appreciated.

Nor were they, it would seem, content with their home manufactures, for it appears from Arrian's Periplus of the Erythrian Sea that large quantities of foreign wine were regularly imported two thousand years ago, and these met a ready sale in the country. The varieties mentioned are 1, *Λαοδικηνος*, or wine of Laodicea in Syria; 2, *Ιταλικος* or Italian wine, and 3, *Αραβικος* or Arabian wine.† These, from the circumstance of their having been brought

\* नूतनं गुडसङ्काद्यं शतमेकं पलं तथा ।  
जलं त्रिशत्यलं देयं स्थापयेन्मृदुभाजने ॥  
वावरीलचसङ्काद्यं वदरीलचमेव च ।  
प्रस्थं प्रस्थं प्रदातव्यं पूनं देयं यथोचितं ॥  
लोभश्च कुडवं दत्वा चार्द्रकं च पलद्वयं ।  
गुडं सङ्काद्यं दत्वा दापयेद्बुद्धिमान् भिषक् ॥  
प्रथमे चार्द्रकं देयं द्वितीये वावरीलचं ।  
तृतीये वदरीं दत्वा मोक्षयित्वा भिषक् ॥  
मुखे शरावकं दत्वा स्थापयेद्विषसयं ।  
पूगश्च लोभचूर्णश्च दापयेत्तद्वनकरं ॥  
मुखे शरावकं दत्वा यत्नं कृत्वा च यन्त्रेण ।  
मुखसन्मन्त्रेण कृत्वा स्थापयेद्विषविंशतिः ॥  
वृणये मोक्षिकापात्रे मयूराक्षोऽपि यन्त्रके ।

† Vincent's Periplus II, Appendix, p. 67.

from distant countries, must have been much more costly than the spirituous liquors of India, and consequently none but the wealthy could afford to drink them.

The different liquors were always taken neat, and it was necessary, therefore, to take some saline, sub-acid, or sweet stuff, to remove the pungency or smarting caused in the mouth by the raw spirit. For this purpose fruits, roasted mince meat, and cakes were most approved by the higher classes, but the lower orders had to content themselves with parched or fried grains and pulses seasoned with salt and chilly. These wine biscuits were held in great requisition, and were known by various technical or slang names, such as *Upadars'a*, *Upadañsa*, *Avadañsa*, *Chakshana*, *Madyapāsana*, *Mudrá*, &c. I have noticed the word *nakula* also so used in the Bengali Chandi and some of the Tantras, but I am not able to put my hand on the text of the latter just now. The word probably came from *nakuli* flesh-meat; but I learn from my friend Mr. Blochmann, that in Arabic the word is used in the same sense, and it is possible that some of the modern Tantras borrowed it from the Muhammadans. Anyhow the word has become generally current, and one of the names of S'iva is *Nakules'a* or "lord of wine biscuits," and no drinking party was formerly complete without a good supply of these tit-bits.

Looking to the nature of the climate, the character and temper of the people, and the anathemas which the S'āstras have, from time to time, hurled against the drunkard, it might be taken for granted that men of the higher castes, and good people generally, did set their faces against drinking, or, at least, did preserve an outward appearance of horror against those who openly outraged the mandates of the Smṛiti; but it would seem that for all that cases of delirium tremens turned up pretty frequently, and several very

यथाविधि प्रकारेण मन्दमन्देन वञ्चना ॥  
 बुद्धिमध्ये निधातव्यं मृत्तिकादृढभाजने ।  
 तदौषधश्च तन्मध्ये उद्धरित्वा विनिक्षिपेत् ॥  
 नालश्च युगलं दत्त्वा कुक्षौ च गजकुम्भवत् ।  
 कुक्षुमध्ये निधातव्यं पूगश्च शैलबालक ॥  
 दध्नाश्च लवङ्गश्च पद्मकोशीरचन्दनं ।  
 शतपुण्यायनानी च सरिषं जीरकद्वयं ॥  
 शङ्खी मांसीलनेला च जातीफलसमुत्तकं ।  
 क्षन्धिपर्णी तथा शृङ्गी मेथी मेथी च चन्दनं ॥  
 रक्षा चार्द्धपलान् भोजान् कुडयित्वा विनिक्षिपेत् ।  
 यथाविधिप्रकारेण चालनं दापयेत् सुधीः ॥  
 बुद्धिमान् मौज्जन् ज्ञात्वा उद्धरेत् विधिवत् सुरां ।  
 रतममं पिबेन्नित्यं यथा चातुषकमनात् ॥  
 रति शृङ्गाचार्यविनिर्मिता यतसञ्जीवनी सुरा ॥ • ॥

expressive names were current in the country at one time to indicate the disease. One of them means "wine horror" *madátanka*, another "wine disease" *madátyaya*, a third "wine complaint" *madavyádhi*, &c. The descriptions of the disease, as given in Sanskrit medical works, are detailed and precise, discriminating carefully between the illness caused by excess, and that by sudden abstinence after a protracted over-indulgence. These names and descriptions could not have come to existence, had there not been immoderate drinking in many instances to give rise to the complaint.

There is another indication in medical works which is worthy of note ; it is the multiplicity of receipts for removing the odour of wine from the mouth. None but the rich or well-to-do could have required such prescriptions to guard against the accusation of having taken wine, and the existence of the recipes implies the existence of a class of men who were addicted to drinking, and yet wished to pass among their neighbours for teetotallers.

Of fermented beverages, which were drunk without previous distillation, four kinds are mentioned, *viz.* cocoa toddy, palm toddy, date toddy, and the soma nectar. The first was known only to those who inhabited the sea coasts, where alone the tree which yielded it, is met with. The acetous fermentation in its case was so rapid, that transmission of the liquor from one part of the country to another was out of the question, and none but those who lived in the neighbourhood of the tree could drink the juice in a vinous state. The date and the palm toddies suffered in the same way, and were unfit for transmission to distant places ; but the trees which yielded them were common almost all over India, and so they were more easily accessible, and more widely known. But they never seem to have attained any great popularity. The soma nectar was likewise open to this objection ; for it, too, had no keeping quality, and, for aught we know, was never manufactured for sale ; but it was associated with the earliest history of the Aryans, even before they separated from the ancient Persians, and enjoyed the proud pre-eminence of a god as long as Vedic rites governed the conscience of the people. The Ríg Veda Sañhitá is most lavish in its praise, and all the four Vedas furnish innumerable mantras for repetition at every stage of its manufacture, and from the moment a resolution was made to commence one of the rites at which it was to be used (and all the principal rites such as the Dars'a, Paurṇamása, Jyotishtóma, Ukthya, Shodas'imán, Vájapeya, Atiráttra, Aptaryáma, &c., could not be celebrated without it), nothing could be done without appropriate mantras, and the ritual throughout was most complicated and tedious. It would be foreign to the object of this paper to describe in any detail the several steps in the manufacture of the beverage ; suffice it to say, that it was made with the expressed juice of a creeper (*Aselepias acida*, or *Sarcostema viminalis*), diluted with water, mixed with barley meal, clarified butter, and the meal of wild paddy (*nivára*), and fermented in a

jar for nine days.\* The juice of the creeper is said to be of an acid taste, but I have not heard that it has any narcotic property; I am disposed to think, therefore, that the starch of the two kinds of meal supplied the material for the vinous fermentation, or, in other words, played the part of malt, and the soma juice served to promote vinous fermentation, flavour the beverage, and check acetous decomposition, in the same way that hop does in beer. Anyhow, it may be concluded that a beverage prepared by the vinous fermentation of barley meal, should have strong intoxicating effects, and it is not remarkable, therefore, that the Vedas should frequently refer to the exhilaration produced by its use in men and gods. The addresses to Indra, Agni, Mitra, and other gods in the Rig Veda are full of allusions to exhilaration caused by the use of the soma. "The sacred prayer, desiring your presence, offers to you both, INDRA and AGNI, for your exhilaration, the *Soma* libation. Beholders of all things, seated at this sacrifice upon the sacred grass, be exhilarated by drinking of the effused libation." (I. 7. xxvii. 4, 5.) Other quotations on this subject may be easily multiplied, but they are not needed. Suffice it to say that the object of drinking the soma is expressly stated to be intoxication: *madāya arvenehi somakāmam tvāhe rayam sutastasya puṁ madāya*; and Indra drinks it in such large quantities, that his belly becomes enormously distended. *Uruvya chājāthara āvrihasva*. As regards men, its effects are described as equally exhilarating and inebriating. A story occurs in the Black Yajur Veda in which a sage, Vis'varupa by name, son of Tvashtu, while engaged at a soma sacrifice, is said to have indulged so inordinately in the exhilarating beverage as to have vomited on the animals brought before him for immolation. For this, however, no proof is wanted, for the effect of soma on the gods could have been only assumed by a knowledge of what it was on the worshippers.

The soma beer lasted for several days after its nine days' fermentation. In some of the rites it certainly lasted for twelve days, but how much longer I cannot ascertain. It is certain, however, that it could not be kept sound for any great length of time, without distillation, and in a distilled spirit the soma would be of no use. Accordingly, we find that no soma juice was used when arrack was distilled from fermented meal. The liquor, thus prepared, was, as already stated above, called *sura*, and it was used as an article of offering to the gods in two important rites, namely, the *Sautrāmanī* and the *Vajapeya*. The mode of preparing it is described in the canons of Baudhāyana and Kātyāyana. They recommend three articles, *viz.*, sprouting paddy, the sprout brought on by steeping paddy in water very much in the same

\* Stevenson's *Sāma Veda*, p. 5. and Haug's *Aitareya Brāhmaṇa*, I. p. 6. Manning's *Ancient India*, I., p. 86. For the mantras used in the course of preparing the soma beverage vide, *Taittiriya Saṁhitā*, Kāṇḍa I. Prapāthakas II. III. IV., and Kāṇḍa VI. Pt. I. to IV. The *Kalpa Sūtras* and the *Soma prayogas* supply the details.

way as malt is produced, slightly parched barley steeped in curds and diluted butter milk, and coarse powder of the same steeped in whey. After proper fermentation, this was distilled in the usual way, and the liquor produced was poured in oblations on the sacred fire in lieu of the soma beer. The *Taittiriya Bráhmaṇa* supplies a number of mantras for the preparation of the liquor, but I can nowhere find any description of the still in which the distillation was effected. Kátyáyana recommends that the different articles required for the manufacture of the liquor should be obtained by barter, and not by purchase with coins. In the Sautrámani rite, the offering of the liquor should be preceded by the immolation of three animals, a bull being one of them. The worshippers were required to partake of the remnant of the offerings, as the ceremony would be incomplete without the repast.

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*On the History of Pegu.*—By Major-General SIR ARTHUR P. PHAYRE,  
K. C. S. I., C. B.

The chief authority which has been followed in this sketch of the history of Pegu, is a narrative written in the Taláing, or Mun, language by Tsha-yá-dán A-thwá, a Buddhist monk. It was derived from ancient records and traditions, and was translated into Burmese by Máung Shwé Kyá, a learned Taláing. The chronology of the narrative is very confused, though the most important date, that of the foundation of the city of Pegu, is correctly stated. Neither the author nor the translator, however, has attempted to correct the manifest errors which exist. In this paper, the dates of the more prominent events in early times have been rectified by me from contemporary Burmese history; and in later times, from the accounts of European travellers. The few particulars which can be gathered regarding the history of Tha-htun, the most ancient city on the coast of Pegu, have been placed at my disposal by Mr. St. Andrew St. John, Assistant-Commissioner in British Burma. They were derived from MSS. in his possession. I have also had the advantage of consulting an essay in the Burmese language, on the same subject written by Máung Byan, a Taláing gentleman of ancient family. This was procured for me by Colonel D. Brown, Commissioner in Tenasserim. I have read what has been written on the ancient history of Pegu by the Reverend Dr. Mason, in his excellent work on Burma; and have consulted the Gazetteer of Pegu, edited by Major M. Lloyd, Deputy Commissioner. The notices of events in Burma and Pegu by the old Portuguese voyagers, as narrated in the lucid general summary by Mr. Talboys Wheeler, and the valuable edition of the travels of Nicolo Conti in the early



part of the fifteenth century, by Mr. R. H. Major, together with other travels by Europeans, in that and the following century, have been used to correct, or to confirm, the statements in the native annals.

The country now called Pegu, or as written by the natives Bagó and Pégu, consisted in ancient times of the delta of the E-rá-wa-ti, and the land in the lower courses of the rivers Sit-táung and Thán-lwin (Salwin). At different times the coast as far south as the Tenasserim River has been subject to the monarchy; while to the north the limits of the kingdom varied according to the power of the kings to defend their territory from the Burmese. The northern boundary on the E-ráwati River, may as a general rule be fixed at A-káuk Táung, about thirty miles below the town of Prome. In remote times, and long before the foundation of the city of Pegu, from which the name of the whole country was afterwards derived, the sea coast from the mouth of the Pa-thin (Bassein) River, near Cape Negrais, to the mouth of the Thán-lwin, (Salwin) was known as Rá-ma-nya, or the country of Ráma. This shows an Indian influence.\* The classic name for the town of Maulamyaing (Moulmein) is still Rámapura, though this may have been transferred to it from a city once existing near the present Rangun. The country of Pegu was afterwards called Hán-thá-wa-ti, which is still the classic name, and the origin and meaning of which will presently appear. The etymology of the word Maulamyaing, which is the Burmese form of the Taláing name Mut-mwa-lem, signifies "one-eye-destroyed;" the tradition being that it was founded by a king having a third eye in the centre of his forehead, which was destroyed by the machination of a woman. This story, as Dr. Mason observes, suggests the legend of Siva. And though this appears at first sight to clash with the classic name Rámapura, yet from the history of Pegu, it is evident that during successive periods, the country participated in the religious revolutions of the Buddhists and various Hindu sects, through which the neighbouring coast of India passed.

The earliest notice of Rámanya which can be accepted as historical is derived from a Buddhist source, the Mahávanso of Ceylon. Therein is recorded the deputation of the great missionaries, Sono and Uttaro, (Thauna and Uttara), by the third Buddhist synod, held at Pataliput, B. C. 241. They were sent to the country called Suvarna bhumi, (Thumannna bhumi), or "golden land," to preach the great reform determined on by the synod. The name given to the country was the Pali designation of the portion of Rámanya of which Tha-htun was the capital. The ruins of Tha-htun still exist on a small stream about ten miles from the seashore, and forty-four miles travelling distance N. N. W. from Martaban (Muttama). The city appears to have been laid out on the general plan of ancient Indian cities.

\* The island of Ramri, or more properly Ram-byi (country of Ráma), shows the same influence.

and which has been followed in the modern capital of Burma. The ground plan of the outer rampart is a square or oblong, within which is an open space of about a hundred and fifty feet, and then a second but lower wall or rampart, and moat. The east and west inner walls are each 7700 feet long; while those on the north and south are about 4000 feet each, enclosing a space of about seven hundred acres. The angles, however, are not exact right angles. In the centre of the city is the fortified royal citadel, measuring from north to south 1080 feet, and from east to west 1150 feet. This was for the defence of the palace, the "throne room" being, as is now the case at the Burmese capital, nearly the central point of the city. There are two gates, or spaces for entrance, in the northern and southern faces of the rampart, but it is impossible to say how many on the eastern and western. Such is the description given by Mr. St. John of the present appearance of Tha-htun. The position of the city with reference to the approach from sea, is now not suitable for a port. But there is strong probability that a gradual rise of the land, including all the adjoining gulf of Martaban, has been going on for several centuries, which has destroyed the port. With this change of level it is probable that the influx of tide, called "the bore," is now more violent near the mouth of the river Thit-taung (Sittang), than it was two thousand years ago.

The traditions as well as the scanty historical notices which remain regarding Tha-htun, show that it was founded by Indian colonists. One tradition is, that the original colonists came from Thu-binga in the country of Ka-ra-nika, or Karanatta. By some this is made to refer to the founding of Maulamyang. It may, however, be accepted as certain that people from what is now called the Coromandel Coast, established at an early period, possibly a thousand years before the Christian era, one or more trading stations on the coast of Pegu. That Tha-htun had risen to some importance as a city in the third century before Christ, is shown from its having had allotted to it missionaries at a synod held under the influence of the Buddhist Constantine Asoka. The name Suvarnabhumi, or "golden land," by which the country was then known in India, probably refers to gold being exported in great quantity from the emporium. Gold, no doubt, was brought from Yunan down the Eráwati River at a very early period. It continued to be an article of commerce from the same country until within the last sixteen or eighteen years, since which the trade has been interrupted.\* There is also an old gold "diggings" about a hundred and twenty miles distant from Tha-htun on the Paung-laung or Sit-taung River. The town is still

\* In a note on the metals of Burma by Dr. T. Oldham, published in Yule's *Mission to Ava*, it is stated on good authority, that the annual amount of gold brought from China (Yunnan) overland to Ava for some years before 1855 was 1100 lbs. weight. In one year, 1800 lbs. weight was imported.

called in Burmese *Shwégyin*, or "gold sifting place." Gold is indeed still found there, but not in sufficient quantity to be remunerative, except to very poor people. These facts appear to explain satisfactorily the classic name of the country. The name Tha-htun is derived from vernacular words having the same signification.

One of the early Buddhist legends referred to by the native historians is to be found recorded in books still existing in the monasteries of Ceylon.\* Two merchants from Thuwanna bhumi, named Tapassu and Bhallaka, had gone on a trading expedition to Northern India. On returning with their waggons of merchandize to reach the sea coast, they passed through Magadha, where Budha was absorbed in meditation and in the seventh week of his fasting, in the Kiripalu forest. The merchants made an offering of honey to Budha, who, at their request, bestowed on them eight hairs of his head as relics. These they brought to their own country, which are now believed to be enshrined in the Shwé Dagon pagoda at Rangun. This legend may be accepted as showing that at an early period, the Indian merchants of Suvarnabhumi traded to Upper India, and were considered a community of sufficient importance to have attributed to two of their body the honour of a personal interview with Budha. At a later period, the commercial importance of Suvarnabhumi is shown from the emporium Subara appearing in Ptolemy's list of places on this coast, as has been pointed out by Colonel Yule.

Concerning the first building of Tha-htun, it is related that before Gautama appeared, there reigned a certain king Ti-tha, in the city of Thu-bin-na (or Thu-bin-ga), in the country of Karanaka. He had two sons Ti-tha Kummá and Dzá-ya Kummá. The young princes determined to abandon the world and become hermits. They, therefore, left their home, and went to dwell on separate mountains, near the seaside, described as being not far from the future site of the city of Tha-htun. The whole country was then forest. Once when walking on the seashore, the brother hermits found two eggs, which had been deposited and abandoned by a female dragon, who came up out of the sea. The hermits carried away the eggs, from which in due time issued forth two male children. The hermits brought up the boys, one of whom died at ten years of age; but being born again in Mit-ti-la, about the time of the appearance of the lord Gau-ta-ma, became, while yet a child, one of his disciples. The boy, produced from the egg taken by the elder hermit, lived in the forest until he was seventeen years of age, when by the help of Tha-kya,† he built the city of Thuwanna-bhumi, called also Tha-htun, and reigned with the title of Thiha Há-dzá. By the intercession of him who, in a former birth, had been his younger brother, but had now risen

\* See Spence Hardy's *Manual of Buddhism*, page 182.

† Sekra, the chief of the second dewaloka, or heavenly region, answering to Indra in Hindu mythology.

to a Rahánda, the lord Gautama himself came through the air and visited Tha-htun. This was thirty-seven years before he entered Nirvána. The country is spoken of reproachfully as a land where fishermen and hunters abound, these being callings opposed to the tenets of Buddhism. But the king and the people of the city listen to the preaching of Buddha, and the future greatness of the country is predicted. But though the people immediately around the city were well disposed, those at a distance were savage and resentful. It is related how the great teacher, attempting to land near the mouth of the Than-lwin river, was stoned by the Bhí-lús and evil Náts who dwelt there. In these words is shadowed forth the rejection of Buddhist doctrine by the native inhabitants, who afterwards became distinguished for their religious zeal.

From this time the historians of Tha-htun profess to have a list of all the kings who reigned in Thuwanna bhumi, distinct from the kings of Pegu. It is now impossible to decide how much of this list is historical and how much fictitious, until near the time of the destruction of the monarchy in the eleventh century of the Christian era. Tha-htun was then taken and destroyed by Anaurahtá, king of Pu-gán; and the king Manú-ha, with his whole family, the nobles, monks, artificers, mechanics, and skilled workmen of every description, were carried away captive. There are the names of fifty-nine kings in the list, who are said to have reigned for sixteen hundred and eighty-three years. The events of their reigns are discreetly veiled under the obscure phraseology of metrical lines. By the chronology it seems to be intended that the reign of the son of the first king Thi-ha Rádzá, commenced in the year that Gautama attained Nirvána. Taking this as a starting point and accepting the Burmese era of religion as commencing 543 B. C., then, as Thi-ha Rádzá is said to have reigned sixty years, we find the year 603 B. C. as the commencement of the monarchy. This would give the year 1080 A.D. as the year of its destruction by Anaurahtá. The time thus deduced for the latter event does not differ very much, considering all things, from the Burmese account. Anaurahtá, according to the Mahá Rádzáweng, ascended the throne of Pu-gán in the year 1017, A. D., and reigned forty-two years. Within that period therefore he captured Tha-htun. The list of the kings as given in the native chronicles is added. But it is not considered to have any historical value, except as a generally correct representation of the existence of the monarchy, and its destruction with the city, about the period stated, by the Burmese king.

Among the few facts recorded in the native annals of Tha-htun which need be mentioned here, is the arrival of the great missionaries Thauna and Uttara, which is put down as having occurred in the year 228 of religion, being 320 B. C., instead of the true date 241 B. C. On their arrival, they and their disciples were denounced by the existing teachers as bhíl-ús,

or monsters, the name here bestowed upon heretics and scoffers. They were violently opposed and beaten with sticks. But the mild demeanour of the Rahándas gradually made their authority prevail. The people were won over to believe them, and new-born children were named after them. The pagodas which had long been neglected and round which jungle had grown up, were repaired. Pleasant gardens were now planted for the resort of the religious, and the reformed doctrines were triumphant.

The only other event of importance which is mentioned in the history of Tha-htun is the introduction of the Pi-ta-kát, or books of the Buddhist scriptures, by Budhaghosa. This event, so important to all the Indo-Chinese nations, is noticed by the Right Reverend Bishop Bigandet in his valuable "Life or Legend of Gautama," and the date therein ascribed to it, from Talaing or Burmese authority, is A. D. 400. Up to a recent period, the histories written by Taláings or Burmans represented Budhaghosa as a great Rahán of Tha-htun, who went to Ceylon, and brought from thence the sacred books to his native land. This statement has, however, been corrected in the latest edition of the Burmese national history (*Mahá Rádzaweng*), which was written, or revised, in the palace at Amarapura about forty years ago. The story of Budhaghosa is therein correctly told, and has apparently been derived from the Mahavanso of Ceylon. The date assigned for Budhaghosa's voyage to Tha-htun is A. D. 403.\* Even the Taláing writers, long jealous for the honour of their country, seem now to acknowledge their error as to the birthplace of their great teacher. In a late paper by a learned Talaing which I have perused, it is acknowledged that there are two accounts regarding Budhaghosa; and it is only argued that in returning from Ceylon to the continent of India, he may have come by ship to Tha-htun, and revived by his presence the drooping flower, religion. That Tha-htun was his native place, seems to be silently abandoned.

All that can be gathered of the early history of Tha-htun has now been noticed. The only explanation which can be offered for the entire absence of trustworthy ancient documents, and the want of details with any historic value, is the ruthless destruction of everything by Anaurahá, king of Burma, in the eleventh century of the Christian era.† All that was moveable and worth removing, was then carried away to Pugán, and though Tha-htun still remained as a port, to which perhaps a few foreign ships resorted, the bulk of the trade passed to the city of Pegu; or was two or three centuries later established at Mut-ta-ma (Martaban).

\* In Max Müller's introduction to Captain Rogers' parables of Buddhaghosa, the period between A. D. 410 and 432 is stated as being that of the literary activity of the great teacher in Ceylon.

† See *Journal of the Asiatic Society of Bengal*, for 1868, on 'History of the Burma race.'

It is now time to turn to the history of Pegu. This country became known to Europeans in the fifteenth century when it was a powerful kingdom. Afterwards it long existed as a mere "geographical expression," but under other influences is once more rising to commercial greatness.

Concerning the foundation of the city of Pegu the legends relate that at the time when the lord Gautama came through the air, attended by thousands of Rahāndas to visit the king of Tha-htun, the sea flowed over the whole of the low country, now occupied by Rangun and Pegu. After preaching to the king and people of Tha-htun, Budha returned through the air to go to the middle land. When passing over the sea, a small sand-bank appeared, which rose above the surface of the water, shining like a silver islet; and there the lord beheld a pair of golden *hānsas*.\* He then predicted that hereafter a great city and country would arise in that spot; for wherever golden *hānsas* resort, to feed and enjoy themselves, happiness and a great future are sure to follow in the land. The country, it was predicted, was to be called 'Hanthiawati.' These birds were supposed to live on a beautiful lake in the midst of the Himālaya, which region was, in the imaginations of the tropic-dwelling Talings, invested with the grandeur of immensity, not unmixed with gloom. There all kinds of lotus flowers of various colours rested on the water, amidst which, never disturbed by man, the birds slept at night, and came to their far off feeding place in the morning.

Now it so happened, according to the divine prediction, more than nine hundred years after the lord had entered Nirvāna, that the silvery sandbank

\* The *hānsa*, or *henthā*, is still the sacred bird of Pegu. Much discussion has arisen as to its identity. It is not a native bird of the country. The Burmese and Talings refer to the Himālaya region as its home, and while supposing it to be a superior order of wild duck or goose, describe it in such glowing but unscientific terms, that an ornithologist would be puzzled how to classify it. Spence Hardy in his "Manual of Buddhism," when mentioning *hānsas* as inhabiting the Himālaya according to the Buddhist geography, observes: "This is regarded as the king of birds, and by Europeans is generally supposed to be the golden winged swan." Colonel Yule, in his narrative of the Mission to Ava in 1855, suggests that it may be "a mythicised swan." Mr. T. T. Cooper in his book of enterprising travel to the frontier of Eastern Tibet has the following passage, which may be accepted as indicating the bird referred to in the legend. "The large yellow wild duck is met with on all the Thibetan streams and mountain pools at a great elevation. These ducks were precisely similar to the brahmini ducks of the upper waters of the Brahmaputra. I was anxious to secure a specimen and fired at the first I saw, but luckily missed, for a Lama who was with us, rushed up in great consternation. The yellow ducks were sacred to the grand Lama, and to kill one would be a great crime, even to have fired at the sacred bird was an offence." These birds are represented in the "boat scene" of Sakya's death, carved in bas-relief at Sanchi (See Cunningham's *Bhilsa topes*, Plate XI.) One of them represents a former existence of Gautama's, and probably also of the future Buddha Arimateya.

had risen up, so as to be plainly visible above the surface of the sea. A foreign ship which came from the city of Bij-ja-ná-ga-ran, had been on a trading voyage to Tha-htun, and in returning passed near the sandbank. The tide was falling and the sailors saw a number of golden *hánthas* feeding and disporting themselves after their kind. One pair was conspicuous above the rest. The sailors looked and wondered. When they reached their own country, they related what they had seen. Their story reached the king Ban-du-rá-reng. The king's teacher being a man of learning, well read in the scriptures, knew that the lord Gautama had been to that country, and that what had been seen by the sailors was an omen of its future greatness. By his advice, the king determined to secure for his descendants the spot where the *hánthas* had been seen. He, therefore, had a stone pillar engraved with his name and title. This was conveyed in a ship to the spot, and deposited in the sea, close to the silvery sandbank. After this, when one hundred and sixty years had passed, the silvery sandbank had risen much higher and become firm land. King Bandurá-reng had passed away, and his grandson Ku-wá-tha Ná-reng now reigned. He knowing all that had occurred, sent a ship under a wise man of high rank to make search for the stone pillar deposited by his grandfather, and so to prove his right to the land.

Now at this time A-din-na Rádzá was king of Tha-htun. He was jealous for religion, and had succeeded his father Thin-na-geng-ga to the exclusion of two half-brothers, whose succession had been favoured by his father during his lifetime. The story of their birth is thus told. On the sea-shore, far from the habitations of men, a female dragon came and laid an egg. A hermit who dwelt in a cave hard by, found the egg and took it to his home. In seven days a female child was produced from the egg, who was brought up by the hermit. When grown up, she was married to king Thin-na-geng-ga, and raised to the rank of chief queen. She gave birth to two sons, who were named Thamala and Wimala. The queen, notwithstanding her beauty and the high favour of the king, was always an object of aversion among the nobles of the court, though it was not then known that she was of the Nága or dragon race. This was discovered by the sagacity of the king's teacher, and she then died suddenly in a very mysterious manner. Her two sons were sent away to the hermit, who was called their grandfather, and who brought them up in the forest. On the death of their father, another son of his, called A-din-na Rádzá, succeeded to the throne. The two young princes, by the advice of the hermit, determined to build a city for themselves to the west, on the land where the hermit knew the golden *hásas* used to feed, and where the lord Gautama had predicted that a great city would arise. They, therefore, collected one hundred and seventy families from the country of Tha-htun, and embarked them on bamboo rafts, ten families on

each. They floated down the stream on the banks of which the rafts had been made, and after many perils, reached the spot where the city Han-thá-wa-ti was to be built. Some people who dwelt on the west side of the river, numbering in all three hundred and thirty families, now joined the two princes, who thus had with them in all five hundred families. When they were considering how to lay out the city, they were suddenly joined by two venerable men, who were Tha-kya Meng (Sekra, or Indra), and an attendant *deva*. They appeared in the guise of carpenters, with instruments, measures, and ropes, and offered to help the princes. This offer was accepted with joy; but when they were about to measure the ground, the nobleman who had been sent by the king of Bij-ja-ná-ga-ran appeared with his followers, and claimed the ground for his master. The two princes replied saying, "You are foreigners, you have no right to our native land." The nobleman answered that when thirteen fathoms of water existed over the spot, an ironstone pillar, with the name, title, and seal of the king of Bij-ja-ná-ga-ran had been placed there. The disguised Tha-gya Meng now replied for the princes that a golden pillar had been placed in that spot before the stone-pillar had been deposited, on which their names were inscribed, and it would be found deeper down than the other. It was argued, therefore, to dig for the pillars, and the right to the land was to be determined by the ownership of the older pillar. Now Tha-gya Meng foresaw by his superior sagacity that, if western foreigners were to be supreme in this land, false heretical opinions would arise; whereas the divine prediction was, that true religion was to be built up; the *bidagát* (*pitakattaya*) was to be recited and revered, and holy relics were to be worshipped. He, therefore, created a golden pillar, on which were inscribed the names of former kings of Tha-htun, and by his power it was conveyed under ground ten fathoms beneath the stone pillar of the Kulás (western foreigners). So when they assembled to dig, and the Kulás had found their stone pillar, Tha-gya Meng said, "Yours is true, but it was placed after ours, which is deeper down, and by which our claim will be proved." The Kulás replied, "If you have an inscribed pillar beneath ours, we will acknowledge ourselves defeated." Then they dug down, and lo! at ten fathoms depth was found a golden pillar, with a date more ancient than that on the stone pillar. The Kulás then acknowledged themselves defeated, and went away taking their stone pillar with them. The spot where the golden pillar was found, being the place where the golden *hánsas* fed, was made the centre from which the city was marked out. Tha-gya Meng measured the ground with a rope on which pearls were strung, so that the land might be sacred, and set apart for ever, free from the rule and ownership of foreigners, or any but its own princes. The golden pillar was moved a little to the south, and a pagoda was then built within which it was enshrined, and in memory of the defeat of the



foreigners it was called, in the Mun language, *Kyaik-tsa-né*, and in Burmese *Ranáung-myin-phrá*.\* The city was founded in the year of the lord's Nirvána 1116, being equivalent to A. D. 573. *Thá-ma-la Kummá*, the elder of the two brothers, was now consecrated king.

In the story of the foundation of the city of Pegu, and the events which led to it, we appear to have the legendary version of the struggle for ascendancy between Brahman and Buddhist. This struggle was still going on in parts of Southern India in the sixth century of the Christian era, and it would no doubt be extended to the colonies and settlements on the coast of Rámánya. The kings of *Tha-htun* and the principal citizens were of Indian descent, and they probably participated in the changes which were going on in the parent country. The foundation of Pegu, by emigrants of *Tha-htun*, tells both of a dynastic and perhaps a religious quarrel. The Buddhist party eventually successful, represent the founders of Pegu as being of their faith, and their opponents as heretics and foreigners, though the latter reproach was probably the feeling of a later period. One cause of the separation for *Tha-htun* appears to have been the *Nága*, dragon or snake, worship, which, as has been shown by Mr. Fergusson in his learned work, extensively prevailed about this time in India; and the founders of Pegu are stated to have been of *Nága* descent or, in other words, had added snake worship to the reverence, which, by the precepts of Buddhism, should be shown only to the memory or relics of Budha. If this be so, the reform in their worship was made, as was the case in Burma, at a later period. From tradition and such scanty historical notices as have survived, we are led to look to the east coast of India, and especially to the country in the lower courses of the rivers Kistna and Godávári, with the adjoining districts, in other words ancient Kalinga and Talingána, as the countries which at a very early period traded with and colonized the coast of Pegu. The people of Pegu are known to the Burmese, to the Indians, and thence to Europeans, by the name *Taláing*. This word is derived from Talingána, and the name which was strictly applicable only to the foreign settlers, has in the course of time become applied to the whole people. As has already been stated, they call themselves *Mon*, *Mun*, or *Mwun*, a word which will hereafter be considered. The names given in the histories of *Tha-htun* and Pegu to the first kings of those cities are Indian; but they cannot be accepted as being historically true. The countries from which the kings are said to have derived their origin are *Karannáka*, *Kalinga*, *Thubiuga*, and *Bij-ja-ná-ga-ran*. These may be recognised as *Karnáta*, *Kalinga*, *Venga*, and *Vizianagaram*, on the south-eastern coast of India. The last has, in after times, probably

\* The classic name of the city *Hen-thá-wa-ti*, or *Han-sá-wa-ti*, has already been explained. The common name, *Pegu* or *Ba-go*, is said to mean in the Mun language "conquered by stratagem," alluding to the incident above related.

been mistaken for the more famous Vijayanagar, the modern city on the Tambudra river. The word Talingána never occurs in the Peguan histories, but only the more ancient name Kalinga. The names of the more prominent kings of Tha-htun and Pegu, all occur in Indian lists, and have probably been selected as pertaining to orthodox Buddhists, or as being famous in early legend. Thus king Tiktha, Ti-tha, or Tissa, of Karannáka, whose sons are represented as first coming to Tha-htun, is probably the name of Asoka's brother Tishya. The name frequently occurs among the early Buddhist kings of Ceylon. The elder son is called after his father with the affix Kumma; while the name of the younger Dzà-ya, is apparently Ja-ya Sinha, the founder of the Chalukya race in Talingána, whom Sir Walter Elliot\* supposes to have lived in the early part of the fifth century of the Christian era, and Mr. Fergusson about a century later. The eastern branch of this line reigned in Vengidesa, which comprised the districts between the Godávari and the Kistna, below the Gháts, and eventually fixed their capital at Rájamahendri. In the history of Tha-htun, though the two sons of king Tiktha become hermits, they adopt two sons, one of whom builds the city of Tha-htun, and reigns there under the title of Thi-ha Rídzá. This name is probably derived from that of Raja Sinha, the posthumous son of Jaya Sinha above mentioned, who succeeded after a struggle to his father's power, and whose birth and alliance by marriage with his enemies the Pallavas, the possessors of the country south of the Nerbadá, are reproduced at Tha-htun in the dubious birth of Thi-há Rádzá from a dragon's egg, though he is brought up by the hermit Dzà-ya. The kings of the Chalukya dynasty who reigned for about five centuries, were of lunar race, and apparently worshippers of Vishnu.† The establishment of this family caused the flight and exile of numbers of Buddhists, or quasi-Buddhists, from the districts on the sea-coast of Talingána. On this point Sir Walter Elliot has made the following remarks in a communication with which he has favoured me. "There is no doubt, the intercourse between the east coast of India, and the whole of the opposite coast of the Bay of Bengal and the Straits of Malacca, was far greater in former times than at present. It had attained its height at the time that the Buddhists were in the ascendant, that is, during the first five

\* See Numismatic Gleanings, Madras Journal of Literature and Science, Vol. XX. Also, Indian Chronology, by J. Fergusson, Journal R. A. Society, 1869.

† The coins of these kings were stamped with the figure of a boar, and thence came to be called 'varáha mudra.' A large number of gold coins bearing this device, and with characters pronounced by Sir Walter Elliot to be an ancient form of Telugu, were found some years ago on the Island of Oheduba, on the coast of Arakan. They were probably of the fifth century. They were found not far from the sea shore disposed as if hidden by persons wrecked on the coast, or otherwise landing suddenly. They were not at all worn by usage. One of these coins was figured and described by Captain T. Latter, in Jour. As. Soc. of Bengal, Vol. XV., p. 240.

"or six centuries of our era. The first great Buddhist persecution both checked it and also drove great numbers of the victims to the opposite coast. The Tamil and Telugu local histories and traditions are full of such narratives. When the Chalukya prince, brother of the king of Kalyán, was founding a new kingdom at Rájamahendri, which involved the rooting out and dispersion of the pre-existing rulers, nothing is more probable than that some of the fugitives should have found their way to Pegu. One Tamil MS. refers to a party of Buddhist exiles, headed by a king of Man-du, flying in their ships from the coast."

The building of the city of Pegu in A.D. 573, by emigrants from Tha-htun under the princes Tha-ma-la and Wi-ma-la, together with the attempted occupation of the site by the representatives of the king of Bij-ja-ná-ga-ran, have already been related and commented on. There appears no reason for doubting the general facts of the narrative; and it may be admitted that the princes and people of Indian descent in Rámanya, while having causes for dissension among themselves, may have resisted the attempted establishment of a new dynasty from Talingána. But as has already been observed as regards the names of the early kings of Tha-htun, so the names of the actors in the scenes at Pegu, have probably been taken in after times from the chronicles of Talingána, or even of the modern state of Vijayanagar. The name Vimala occurs in the list of kings of the latter state so late as A. D. 1158. I have not found the name Thamala, but the term Malla as a surname occurs constantly among the Chalukya kings of the western line, commencing with Yuddha Malla in A. D. 680.

The early establishment of a colony, or city for trade, on the coast of Rámanya by settlers from Talingána, satisfactorily accounts for the name Taláing, by which the people of Pegu are known to the Burmese and to all peoples of the west. But the Peguans call themselves by a different name. It remains then to be inquired whether we can trace from what race they are descended; whether, like the peoples around them—the Burmese, the Siamese, and the Karens—they belong to the Indo-Chinese family, a branch of the Mongoloids of Huxley, or come from another stock.

The people of Pegu, as has already been stated, call themselves Mun, Mwun, or Mon. Their original language has almost disappeared. It is probable that there are not now one hundred families in Pegu proper, in which it is spoken as their vernacular tongue. In the province of Martaban, however, including a part of Maulmyaing, there are thousands who still speak the Mun language only. These are chiefly the descendants of emigrants who left Pegu in 1826, when the British army retired and occupied the Tenasserim territory. The Burmese, since the conquest of Pegu by Alompra (Alaung Phrá) in 1757-58, had strongly discouraged the use of the Mun language. After the war with the British, the language of the people

who had welcomed the invader, was furiously proscribed. It was forbidden to be taught in the Buddhist monasteries or elsewhere. The result has been that in little more than a century, the language of about a million of people has become extinct.\*

In physical appearance, the Mun people are scarcely distinguishable from the Burmese. They are, however, shorter and stouter, and notwithstanding their more southern position, are generally lighter in complexion than Burmese of the same class. Indeed the higher classes of the Muns, and those whose callings in cities and towns do not involve much exposure to the sun, are much fairer than those of the same classes in upper Burma. This may be partly attributable to the large admixture of Shan blood from Zimé and the adjoining states, which occurred at a comparatively late period of their history. But there are also climatic causes. For about six months of the year, the sky of Pegu is more or less obscured with clouds; and the habit of carrying umbrellas as a protection against sun and rain is much more common with the Taláings than among the Burmese. But the question of complexion among many Indo-Chinese tribes is certainly perplexing. Some of the Karen tribes in the mountains, especially the younger people, are not darker than southern Europeans; while those settled in the delta of the Eráwati, are much the same in that respect as the Mun people among whom they dwell. While then the physical characteristics of the Mun would lead us to class them with the Indo-Chinese around them, their language points to a different conclusion. I believe this peculiarity was first brought to notice by the Rev. Dr. Mason, Missionary to the Karen people. That learned man has, in his work on Burma, pointed out the remarkable similarity between the language of the Mun of Pegu, and that of the Hóro or Mundá people of Chutiá Nágpúr, called the Kols. The first syllable of the word Mundá, which is used, as I understand, to designate the language of several tribes in the western highlands of Bengal, rather than as a tribal name, is identical in sound with the race name of the people of Pegu. The connection of the two peoples as shown by the similarity of their languages in a series of test words, has been commented on by the Honourable Mr. Campbell in a paper on the Races of India in the Journal of the Ethnological Society. We appear then to be forced to the conclusion, that the Mun or Taláing people of Pegu, are of the same stock as the Kols, and other

\* There are, however, some thousands of the Mun people in Siam, who emigrated there towards the end of the 18th and in the early part of the 19th centuries, to escape the cruel rule of the Burmese. Descendants of Mun colonists from Tha-hien were heard of by Dr. Richardson, in April 1837, as being located on the northern frontier of the Karenni country. They were said to have been originally placed there by king Naurahá, being a part of his captives. It would be interesting to know if their language remains unaltered.

aboriginal tribes of India, who may have occupied that country before even the Dravidians entered it. Csoma de Kőrös, in his Tibetan Dictionary, defines *Mon* as a general name for the hill people between the plains of India and Tibet. Assuming that a people having that name, once inhabited the eastern Himálaya region, and migrated to the south, we have now no means of tracing whether the Mun of Pegu came direct down the course of the Eráwati, or parting from their kinsmen the Kolarian tribes in the lower course of the Ganges or Brahmaputra, came through Arakan to their present seat. There appear now to be no indications of their presence, either in Arakan or in the country of the Upper Eráwati; though more careful inquiry into the languages of some of the wild hill tribes, between Arakan and Manipúr, might possibly show their track. The Dravidians of Talingána, who beyond all doubt came by sea to the eastern shores of the Bay of Bengal, probably a thousand years before the Christian era, found the Mun rude savages, who even some five centuries later, are called *bhilús*, or ogres. Yet the Dravidian colonists have been merged into the mass of that wild race. Their name indeed remains in the word Taláing, but it is known only to foreigners, and is not acknowledged in the language of the people. Though the alphabet used by the Mun is derived from an Indian source, through the Dravidians, there is probably little or no trace of the language of that race in the Mun tongue.

The city of Pegu having been founded, the historians of the Mun people thenceforth make it the centre round which the fortune of their race revolves. Thamala was consecrated king by the solemn ceremony of *bithé-ka*, or water poured on the body, and assumed the title of Mahimu Thamala Kummára. This king is stated to have built the city of Mutamau (Mutama, or Martaban), three years after the foundation of Pegu; and he founded other cities in the territory he reigned over. But after a reign of twelve years, his younger brother Wimala conspired against him and put him to death. Thamala left a son who then was seven years old. He was concealed by his mother and sent to a wild district in the hills, east of the Tsit-taung River, where he was brought up amidst a herd of wild buffaloes.

Wimala was consecrated king. In the third year of his reign, he built the city of Tsit-taung (Sittang). After he had reigned five years, in the year 590, A. D., the king of Bij-ja-ná-ga-ran sent an army with seven ships, and a champion seven cubits high, to conquer Han-thá-wa-ti. It was agreed that the quarrel should be decided by a fight between two champions. The whole country was searched, but king Wimala and his nobles could find no one to meet the Kulá giant. At length appeared the lost prince, the son of Thamala, who now was sixteen years old. He fought and slew the giant. His uncle now offered to abdicate the throne; but he would not consent to reign, and again retired to the forest, east of the Tsit-taung River. There

he built the city of Ka-thá in the mountains. King Wimala died not long after, and the young prince then became king with the title of Kathá Kum-má. His reign was prosperous, but lasted only for seven years. Thirteen kings are represented as succeeding these founders of the kingdom, but the hereditary succession was broken by usurpers. The monarchy, however, gradually established its power over the whole country of Rámanya, from Puthin (Bassein) on the west, to Mutamau on the east. Tha-htun appears to have gradually declined, and remained merely as a city and sea port with little territory. The sixteenth king of Pegu, an usurper, is named Punnarika, or brahman-heart, which indicates religious strife as introduced at this time (A. D. 746). He is said, however, to have been eminently religious, and even to have listened daily to the preaching of the Buddhist Raháns. But he is represented as inclined towards the ancient Hindu traditions; for he built, or re-established, the city of Aramána, which is said anciently to have occupied the site of the present city of Ran-gun. He called this city Kámanágo, or city of Káma. At this time, says the Taláing historian, as if anxious to save the king's character as a Buddhist, the land of the Shwé Takun (Dagon) was not distinctly marked off, so that no impious encroachment was made. To the north of this city was built another, which was called Rámawati, now Mengaládun. This king died after a reign of fifteen years. Both his name and the occurrence of Ráma in the name of two cities he built, indicate an actual or attempted revival of Hinduism.

Punnarika was succeeded by his son Tiktha or Tissa, who was very different in his religious views, but who was at length converted and became a sincere believer. In the early part of his life, he was ensnared in the heretical doctrines of Dewadát, rejected the Bidagát, and would neither worship the pagodas, nor listen to the preaching of the Raháns, nor follow the learning of the Brahmans. Not content with this, he destroyed the pagodas, mutilated the holy images and flung them into the river; he prohibited by proclamation the worship of these or of holy relics, and threatened with the punishment of death all who should dare to disobey his decree. The people were dismayed, and remained helpless, but were rescued from peril by a miraculous occurrence. There was a young girl in the city of Han-thá-wa-ti, the daughter of a wealthy merchant, who had been religiously brought up by her mother, and from the age of ten years had listened to the preaching of the law. Badra Devi was sincerely devoted to the worship of the three treasures. She was sixteen years old when the order went forth to throw the holy images into the water. One morning, she went, as was her custom, surrounded by her attendants, to bathe in the stream, and seeing a golden image which had been flung into the water, she drew it out, saying, "Who has done this wicked deed?" The chief attendant replied, "Lady, the king has ordered this, and will put to death any one who worships the holy

"images and relics." The maiden said, "I will devote my life to the three treasures, and will endure death rather than forsake them." She then carefully washed the image, and set it up in a *zayat* which was close by. News of this was soon carried to the palace, and the king in a fierce rage called for Badra Devi. When the messengers arrived, the maiden was still employed in cleaning and decorating the holy image, and she entreated them to let her complete her pious work. Having finished, she then with her attendants proceeded to the palace. When the king heard the report of the messengers, he raged like a hungry lion at the sight of harmless animals. He ordered that the maiden should forthwith be trampled to death by a mad elephant. The master of the elephants having brought a mad one, the animal was urged on to crush the maiden. But she invoked the protection of the three treasures, and the seven good *náts*, while she prayed for blessings on the king, on the elephant, and on its driver. The elephant could not be made to hurt her. Again and again he was urged on with violence, but he would not obey. The king then ordered that she should be burnt with fire. She was thickly enveloped with straw, but the straw could not be kindled. The king then ordered that she should be brought before him. She appeared with becoming modesty and respect, while the king bawled out contemptuously, "Thou hast taken thy teacher's image out of the water, and placed it in a *zayat*; if the image will fly through the air into my presence, I will spare thy life; but if not, thy body shall be cut into seven pieces." Badra Devi begged to be allowed to go to the *zayat*, and respectfully to invite the holy image. She and her attendants therefore went, and certain nobles of the court were sent to watch them. The maiden prayed to the three treasures and the seven good *náts*, that the image might fly through the air to the king's palace. Then straightway the image, the maiden, her attendants, and the nobles, were borne through the air to the royal feet. The king much astonished, said: "Let the Dewadát teachers fly through the air, so that all the people may see them." But they could not do so. The king then believed the truth, and banished the false teachers from his country. Then asking the consent of her parents, he married Badra Devi, and she was consecrated chief Queen. The pagodas and other holy buildings were now repaired, and the people rejoiced greatly. King Tiktha reigned for twenty years, and with him closes the line of seventeen kings who represent the three native dynasties of Pegu.

A gap now occurs in the narrative of events which the native historians either have not attempted to bridge over, or have noticed with only a few general statements. In a preliminary sketch to the copy of the history which I possess, it is stated that the first seventeen kings, extending from the foundation of the city of Hantháwati to king Tiktha, reigned for a period of five hundred years. But in the detailed account of the reigns of those

kings, the sum of the years they are stated to have reigned, amounts to only two hundred and eight. The first part of the history then closes as if a great crisis had been endured. A new chapter is opened which simply states that the destinies of Hantháwati were accomplished; the line of kings broken; and the writer then bursts forth in lamentation over the rule of foreign Burmese kings and their hateful governors. Three of these are mentioned and reviled, and the narrative then passes on to events near the close of the thirteenth century of the Christian era, when Mongols and Turks overthrew the Burmese monarchy; Pugán was captured, and her king a fugitive. Supposing that the seventeen kings represent in some fashion the events of five hundred years, then the close of king Tikthá's reign would be about A. D. 1073. From that time until the capture of the Burmese capital by the Mongols, there is a period of about two hundred and eleven years, of which the Mun chroniclers say nothing, except the loss of their native kings, and the rule of three hated foreign governors. This hiatus is not peculiar to the manuscript history which I possess, but may be traced in others. Thus Dr. Mason from the copy which he followed, dates the foundation of Pegu A. D. 573 and the death of Tik-tha A. D. 841, but immediately after this, there is a blank of more than three hundred years. In Major Lloyd's Gazetteer of the District of Rangun, in which a list of the kings of Pegu is given from native records, this blank does not appear. But that is, because the foundation of Hantháwati has been post-dated to A. D. 1152, a year quite impossible to be reconciled with the histories of Burma, Tha-htun, and the subsequent history of Pegu itself. The cause of these great discrepancies arises from the Taláing historians having sought to conceal the religious revolutions in their country, during the ninth and tenth centuries, and to avoid narrating the conquest of their country by Anaurahtá, king of Pugán, about A. D. 1050, with its continued subjection to Burma for more than two hundred years. And it is strange that in the Burmese Mahá Radzá weng, though the conquest of Tha-htun is narrated at great length, nothing is said of the occupation of the city Hantháwati. Yet no doubt, the city was then taken by the Burmese king. Either then it was supposed that the capture of the ancient city of Tha-htun rendered special mention of Pegu unnecessary, or the chroniclers hesitated to record the first instance of the falsification of the legend, which in the cause of religion assigned to Pegu a perpetual succession of kings in the line of Thamala kumára. The Taláing historians have endeavoured to represent their country as having been uniformly orthodox Buddhist, while the records they present to us, show that there have been frequent alternations of Buddhism and Brahmanism. The names of the two last kings of the native dynasty, Punnarika and Tiktha, with the few notices we have regarding them, show that their reigns represent periods of religious strife between the two great sects, and



the attempted introduction of a form of worship antagonistic to both. Punnarika, or "brahman-heart," sufficiently indicates the influence during one period; while the name Tiktha, or Tishza, identical with that of the brother of Asoka, points to a corrupt Buddhism, and the re-establishment of that worship. This is typified in the pleasing legend of Badra Devi, and Buddhism has been the cherished religion of the people from that time until now.

From the time of Anaurahtá the history of Pegu becomes clearer. The measures of his successors in that country are constantly referred to in Burmese history. His son and successor Tsau-lú appointed his foster-brother Ra-mán Kán governor of Pegu. But he ungratefully rebelled, and marched with a large army of Taláings against Pugán. At first he was successful, but was at length killed. In the reign of A-láung-tsi-thu, which extended from A. D. 1085 to 1160, Bassein was the principal port of departure for Ceylon, with which island there was much communication. This king sent an army of one hundred thousand Taláings, to place the exiled son of the king of Arakan on the throne of his ancestors. From this time until near the final destruction of Pugán about A. D. 1277, or by one reckoning 1284, there is ample evidence that the Burmese were supreme in Pegu. During this period, the Shans had come down from Zimmé, and occupied the country east of the Than-lwin (Salwin) River. The time was at hand when they were to become supreme. With the capture of Pugán by the hordes of Kublai Khan, Pegu began to revive. The Burmese king called from his flight Taruk-pyé Meng, fled from his capital to Bassein, ready no doubt to embark for Ceylon if necessary. The Taruk did not follow, but left the country, and the king returned to his capital. But the Burmese monarchy was now tottering, and in the confusion which arose, the Taláing people found the opportunity to recover their independence, though under a foreign dynasty of kings.

The Mun chronicles thus relate the events which led to the re-establishment of the kingdom.

"Now at this time, the country of Hantháwati paid tribute to the king of Pugán, and officers were appointed to rule these, and were relieved in turn. A youth of Burman race, named Akhámwun, lived with his father and mother near the city, and was placed for instruction in a monastery, where he became a probationer. The Abbot soon perceived that he was a youth of great ability, and judged that from the accumulation of former merit, he would become a great man. After passing the grade of a Thámané, he left the monastery, and married into a Taláing family. Being appointed an officer in one of the royal boats, he in time took his turn of duty at Pugán, where he attracted the attention of the king by his zeal and energy, and was promoted to the command of the boat. One

"night he dreamed that he stood with one foot in Hantháwati, and one foot in Pugán, which a Brahman interpreted to mean that he would become a king. On the return of his boat to Pegu, he was careful in collecting what was due from the people, to prevent extortion, and having become popular through the help of his father-in-law, many of the merchants and wealthy citizens joined him. His first care was to repair the city walls, which had been suffered to go to decay. The king of Pugán hearing of this plot, appointed his son-in-law Commander-in-Chief of an army to reduce the city to obedience. This army was defeated, as well as a second, and at last Akhímwun proclaimed himself king with the title of *Thu-nek-khautsá Rádzá*." These events occurred, it is stated, about the Burmese year 635, or A. D. 1273, but the dates given in the *Mun chronicle* are not to be depended on. Probably the Burmese usurper had at this time sufficient power to be practically independent; but it is not likely that he proclaimed himself king before the fall of Pugán, which, as we have already stated, was some years later.

Akhímwun no sooner was king than he belied all the promise of his former life, and by his tyranny became hated. He was at length put to death by his brother-in-law *Leng-gyá*, after he had reigned two years. *Leng-gyá* had possession of the palace for eight days, and was then killed by *Akhyémwun*, who was also a brother-in-law of *Akhímwun*. *Akhyémwun* was now consecrated king of Pegu with the title of *Tarabyá*.

At this time *Muttama* (*Martaban*) had become independent of Pegu. It was ruled by *Wa-ré-ru*, who had deposed the Burmese governor *A-lim-ma* and put him to death. The kings of *Muttama* and Pegu, feeling that they must combine, made an agreement of friendship, and each married the other's daughter. *Taruk-pyé-meng*, who was still king of Pugán, sent an army under *Rádzá Then-gyán*, to reduce Pegu to obedience. The king of Pegu occupied the stronghold of *Than-lyeng* (*Syriam*), and had a stockade at *Ta-kun*. The Burmese force was at *Dala*. The positions were all so strong, that neither party would make an attack. *Waréru* then came with an army to the assistance of his ally, and the two kings advanced by land and water against *Dala*. They were entirely successful, and after several actions, the Burmese were forced to retire. The allied kings followed the Burmese up the *Eráwati* as far as *Padáung*. They then returned and encamped at *Makán*, south of the city of Pegu. Here dissension arose between the two kings which ended in a fight. *Tarabyá* was defeated and fled. *Wa-ré-ru* at once marched, and took possession of the palace and capital. *Tarabyá* was captured by some villagers and delivered up as to his rival, who, at the intercession of the Buddhist monks, spared his life. *Wa-ré-ru*, now king of the whole country, did not choose to fix the seat of his government at Pegu, but after having settled the affairs of the country, returned to *Muttama*.

taking Tarabyá with him. The deposed king was soon after put to death for entering into a conspiracy.

Of the birth and parentage of Wa-ré-ru there are conflicting accounts. The history which I follow, relates that there was at Muttama a merchant of the name of Magadu who traded to the adjoining countries. To the east was the country of Thuk-ka-té, the name of the ancient capital of Siam, or the ancient seat of the royal family, situated on a branch of the river Menam. Magadu went to Thuk-katé, and entered the service of the king of that country. He either possessed a female elephant which gave birth to a white one, or he captured a white one in the forest, which he presented to the king. This was regarded as an omen of his future high destiny. On returning to Muttama, he raised a rebellion against Alimma, the Burmese governor, and put him to death.\* After this, there is some obscurity in the narrative as to the fate of Magadu, and it might almost be supposed that he disappeared. But this arises from the respectful reserve of the chronicler, who refrains from stating distinctly that the *quondam* merchant Magadu became king of Muttama under the name of Wa-ré-ru. It is intimated that his great fortune resulted from the merit of his good deeds in former births. In fact, he was descended from one of the Nat-Bhilú who listened to the preaching of Budha, when he came to the wild region east of Tha-htun, instead of joining those who impiously drove him away. Thus he is claimed as a Mun by race, though it is probable that he was descended from a Shan family from the eastward, which had settled in the country of the lower Than-lwin (Salwin).

Wa-ré-ru was now king of Mut-ta-ma. He was anxious to possess a white elephant, which is the great object of the ambition of a Buddhist king, and especially of an usurper, as it is supposed to indicate his true royal descent. After much negotiation with the king of Thuk-ka-té, or Siam, a white elephant was forwarded by that monarch. This occurred in the Burmese year 655 (A. D. 1293), six years after Waréru had become king. As the strength of his kingdom lay in the country of the Salwin, where the Shans had been settling for several generations, the king made Muttama his capital, though, as we have already seen, he had dethroned Tarabyá and occupied Pegu. The Taláing historians, however, as he did not reign in their ancient capital, do not include his name among the kings of Hantawati.

After the fall of the ancient Burmese monarchy, the Shan chief A-theng-kha-yá, with his two brothers, ruled at Myin-tsaing what still remained of the empire. Having heard of the fame of Waréru's white elephant, he determined to possess it. He marched with an army to Muttama and demanded that the sacred animal should be delivered to him. This was refused,

\* In the Burmese *Mahá Rádsá weng*, the year of Alim-má's death is said to have been A. D., 1281.

and in a battle which took place, the Shan-Burman army suffered a complete defeat. After this, the kingdom had peace for some years. But the two sons of Tarabyá, who were kept in the palace, conspired against Wa-ré-ru, and put him to death. They, however, had no supporters, and were obliged to fly. They took refuge in a monastery, but were dragged forth and killed. Their bodies were brought and laid at the feet of the king's body, and the three were burnt together. King Waréru died thus in the year 668, after a reign of nineteen years.

He was succeeded by his brother Khun-lau, whose first care was to solicit recognition of his title from the king of Siam. This was granted, and the regalia were forwarded to him with a suitable title. Not long after this, the king of Zimmé attacked Dunwun, a city on the east side of the Tsit-táung river, and plundered it. The king took no measures to defend his territory, and seeing that he was a man of no capacity and careless of the honour of his country, Meng Bala, who was married to his sister, conspired against him. He was persuaded to go out in the forest, under pretence of entrapping a wild elephant said to have three tusks. Having inveigled him into the thick depths of the forest, he was put to death after a reign of four years.

Meng Bala at first intended to seize the throne himself, but by the prudent advice of his wife, he made their eldest son, Dzáu-áu, king. The young king was married to a daughter of the king of Siam. But notwithstanding this alliance, he before long was involved in hostilities with La-bun, a small Shan state then tributary to Siam. He sent a force and occupied it in the year 682. In the following year, he marched an army under Khun-meng as Commander-in-Chief to take Dhawé (Tavoy). The city having surrendered, the general marched on to Tanengthári (Tenasserim), which he took without difficulty. He left garrisons and governors in both those cities, and then returned to Muttama with the remainder of his army. During the reign of Dzáu-áu, the country was prosperous. But the king's life was short, and he died after a reign of thirteen years. The kingdom of Muttama which included Pegu, had now become independent of Siam, and from the still disturbed state of Burma, it had nothing to fear from that country. But in this reign first commenced the quarrel between Pegu and Siam, which in long after years led to wars, terribly destructive to life, and which have been the main cause of the present depopulation of the country. The quarrel was continued, when Burma succeeded by conquest to the rights of Pegu, and lasted down to the early part of the present century.

The successor of Dzáu-áu was his brother, Dzáu-dzip, who, at his consecration, assumed the title of Binyaranda. This king, after consulting with his nobles, determined to change the seat of government to Hantáwati. He went there in great state leaving a governor and a sufficient garrison at

**Muttama.** Soon after reaching Pegu, he went to Takun (Rangun), repaired the great pagoda and made offerings. The governors of Puthin' (Bassein) and Myoung-mya rebelled, but were soon overcome. Though the kingdom in the delta of Erawati was thus consolidated, the southern provinces were lost, the king of Siam having retaken Dhawé and Tanengthári. Binyaranda, though unable to retain those distant possessions, thought the time was favourable for making an attack on Prome. That city has always been an object of keen contest between the kings of Burma, and Pegu. At this time, the chiefs of Shan descent who reigned in Burma, had not consolidated their power, and some subordinate chief, whose name is unknown, was supreme in Prome. Binyaranda went against that city with a considerable army, but he was repulsed and killed in the year 692 (A. D. 1330). In the confusion which arose on the king's death, an officer of the palace at Muttama, called Dib-ban Meng, seized the throne and made one of Binyaranda's daughters, named Tsanda Meng Hlá, his queen. He was, however, put to death by the Commander-in-Chief on the seventh day of his reign. For a few weeks also, a son of Dzáu-ju reigned with the title of Egán-kan, but by the influence of the queen who hated him, he was poisoned.

The person now called to the throne was a son of Khun láu, who at this time was governor of Hantháwati: for, notwithstanding the change made by Binyaranda, the palace and seat of government seems to have been again at Muttama. Queen Tsanda Meng Hlá invited the governor to come and settle all disputes. He came to Muttama with a large retinue, and was at once consecrated king with the title of Binya-é-lau. Tsanda Meng Hla became chief queen. The king of Siam was angered, because Egán-kan was the son of his daughter, and he sent an army to avenge the death of his grandson. His army was completely defeated, and the two countries were now at deadly enmity. Though Muttama was now free from a foreign enemy, it suffered from a struggle between the king's son Tsau-é-lau and his nephew Binya-ú, a son of king Dzáu-dzip. While the king was lying sick, these young princes disturbed the country by their quarrel for the succession. The king recovered and placed Binya-ú in jail, but on the intercession of the queen, released him. Before long, his own son died, which left the succession undisputed. Binya-lau reigned eighteen years, and died in the year 710, A. D. 1348. His reign on the whole was prosperous, but it is noted as a bad omen that the white elephant broke one of his tusks; that a severe famine desolated the country; and that there were constant border frays with the Burmese on the northern frontier.

Binya-ú succeeded without any opposition, and assumed the title of Tsheng-phyi-sheng. After he had been on the throne for three years, an attack was made by the Yun Shans of Zimmé on Dun-wun and several towns in Teit-táung. The country was plundered, but the enemy was at

last driven out. The king, anxious to possess a holy relic, sent a nobleman in a ship with five hundred followers, and a letter written on golden tablets to the king of Ceylon, to ask for a relic of Budha. The king of Ceylon, full of friendship and beneficence, granted the request, and placing the holy relic in a golden vase, which was enclosed in other vases, all carefully sealed up, delivered it to the Peguan envoy. It was brought to Muttama, where it was received with great pomp by the king. A pagoda was built for its reception at the spot where the Yun Shans had been defeated.\* Notwithstanding this happy event, misfortunes began to gather round the king. The governor of Pegu rebelled. He was subdued; but the white elephant, in Buddhist phrase, 'erred,' that is, died; and the whole population, from the king to the peasant, clergy and laity, were in an agony of grief. For this portended dire misfortunes to the country. The white elephant received a grand funeral, the body being drawn by the people on a car beneath a royal canopy, outside the city where it was buried in the earth. "But one account," adds the chronicler doubtfully, "is, that the elephant rose up from the funeral car, and stalked majestically into the river, where the water closed over it, and it was seen no more." Some Karen people, not long after, reported that a white elephant had been seen in the forest, and the king, with his whole court and a large army, went to capture it. He was absent for four months, and during that time, his half brother or cousin, named Byát-ta-bá, raised a rebellion. The first intimation the king had of this event was from seeing a star strike at the moon. This was interpreted by his Brahman astrologer to mean rebellion. Returning hastily towards the city, the king heard that Byát-ta-bá had shut the gates, and that his brothers were levying men in the country outside, with whom they entered. The city was defended with cannon,† so that the king could not attack it, and the wives and families of the nobles who were in the royal camp, were inside the city. Many therefore deserted the king, and went over to the rebels. The king retired to Dunwun, and appointed his brother-in-law Thamin Byá-ta-bát, general against the rebels. He closely invested the city, so as to prevent supplies being carried into it. By an artifice of the wife of Byát-ta-bá, who sent a secret letter to him, pretending that she was on the side of the king, he accepted some dishes which she sent, and died from the effects of eating them. The whole of the investing army then fled. Another commander

\* In the histories of Burma and Pegu, many instances are related of relics, or supposed relics, being brought to the country from Ceylon. The facts are gravely related, but nothing seems to be known of the relics afterwards, except the hairs of Budha which are enshrined beneath the Shwé Dagon, and are as freshly remembered and worshipped now, as they were two thousand four hundred years ago.

† This is the first mention of cannon in the history, about the year A. D. 1370. Nothing is said as to where they were procured from.

was then appointed ; but he was killed by a bullet almost immediately, and his army broke up and dispersed. The king now in despair shut himself up in Dunwun city, which was situated between Muttama and Tsit-taung.

Byát-ta-bá, though so far successful, knowing that many of the people of Muttamá were not well inclined towards him, sent a letter and messengers to the king of Zimmé, asking for assistance, and offering to hold Muttamá as his general and deputy. Hearing of this, Binya-ú seeing that his position was becoming desperate, himself sent messengers and presents to the king of Zimmé and offered one of his daughters in marriage. This was accepted ; the march of the Zimmé troops was stopped, and Binya-ú, though unable to recover what he had lost, was not disturbed at Dunwun. There he remained for six years. Byát-ta-bá in the meantime strengthened his position, and at length gained possession of Dun-wun by a stratagem. The king fled on an elephant almost alone, and came to the city of Pegu. This was in the year 732 (A.D. 1370), being the twenty-second of his reign. Byát-ta-bá had now firmly established himself in Muttamá, and to show his sympathy with the southern T'hái people, made his subjects shave their heads in the Siamese fashion. The only opposition to this order was shown in Dunwun.

Binya-ú now turned his attention to the districts of Pegu which were put in order, and walls were built round the chief cities. After a time, by tacit understanding, there was peace between him and Byát-ta-bá. The king caused the great pagodas, Shwé Maudau and Shwé Dagun to be repaired. His son Binya-nwé caused him much anxiety by his intrigues. The king wished one of his younger sons to succeed him, but did not formally appoint him heir-apparent. Binya-nwé finding his father under the influence of the queen against him, began to gather friends to support his interests. Having secretly engaged followers, he left the city at night and joined them. He took possession of the town and pagoda at Ta-kun, where he engaged the services of some western foreigners.\* This was in the month Na-yun 745 (A. D. 1383), when there was an eclipse of the sun. The king was now too ill to make any exertions to uphold his authority, and all orders were issued by the queen. An army was sent against the prince, which he went out and defeated. He did not feel strong enough to attack the capital until he had collected a larger force. He then marched, and while on the way heard of the death of his father. This event stopped all resistance. Thamin Paru, the general who had been employed against him, attempted to escape, but was made prisoner and put to death. Binya-nwé ascended the palace in the month Tabodwé, 747, A. D. 1385.†

\* Most probably Muhammadan adventurers from India or the Persian Gulf. They had been coming to this coast for many years past.

† In the Burmese history, this event is placed in the year 745. See *Journal, As. Soc. of Bengal*, Vol. XXXVII, for 1890.

The young king assumed the title of Rádzá-di-rít. He rewarded all those who had supported him, and put very few of his enemies to death. The queen had bitterly opposed him, yet, in remembrance of her care of him when he was a child, after his own mother's death, he now treated her with respect and honour. There was one powerful nobleman who had opposed him, and who was still unsubdued. This was Láuk-byá, the governor of Myáung-myá, who was of the royal family. He hated Rádzá-dirít, whom he denounced as no son of Binya-ú's, and was determined not to submit to him. He now caused the renewal of the struggle between Burma and Pegu, which had ceased for about a century, or since the fall of the Pugán monarchy, and which only ended in the entire subjection of Pegu about the middle of the eighteenth century.

At this time, Ava was the capital of Burma, and the king Tárabyá, though said to be descended from the ancient kings of Pugán, and also through his mother from the family of the three Shán brothers who succeeded them, was essentially the chief of a Shán dynasty. The king of Pegu belonged to a southern branch of the same race. Láuk-byá seeing that the king of Ava had subdued all his enemies, sent messengers to him, offering, if he were placed on the throne of Pegu, to hold it as a tributary king. The king of Ava therefore sent an army, composed of two columns under the command of his sons, to carry out this plan. One of these marched by the E-rá-wa-ti to Láing, and one by the Tsit-táung or Páung-láung River to Táungú. Both were defeated by Rádzá-dirít before Láuk-byá could arrive to support either, and they retreated to Ava. The history of Pegu states that the king of Ava accompanied his army on this expedition, but this does not agree with the Burmese history. The king of Pegu was sensible that his victory resulted more from the difficulties in the country which the Burmese army had to encounter, than from the superiority of the force he was able to bring against them. He, therefore, sent envoys to Ava with a letter and presents, hoping to establish friendship with the dreaded monarch. But the king of Ava remarked that the letter was a short one, and sternly replied that the Ta-láing country belonged to his ancestors, and would be recovered. The presents were scornfully rejected, and the envoys returned sorrowfully to their master. Thus the present king of Burma showed his determination to recover, if possible, all that had once belonged to the kings of Pugán; and Rádzá-dirít had nothing for it but to prepare for resistance. Láuk-byá addressed the king of Ava, excusing himself for not having appeared with a force to support the Burmese army, and again tendering his allegiance. When the season arrived, Tárabyá marched down the valley of the Eráwati, and as in the previous campaign, established himself at Láing. The king of Pegu was entrenched in a strong position at Máu-



bí, a few miles to the north of Ta-kún. This stockade the Burmese could not take, and were delayed so long before it, that the dreaded rainy season approached. They made a sudden retreat, which turned into a disorderly flight. The Mun army pursued them as far as Prome, but did not venture to attack that city. Being thus rid of the invader, the king determined to reduce to obedience those near him who were dangerous. He first directed his attention to the eastward. He attacked and took Dunwun, the chief of which city had been in communication with Láuk-byá. He next took Lagwunpyin, and from thence sent one of his officers to attack Muttamá. Byat-ta-ba does not appear to have remained in the city, which was defended by two officers having the foreign names of E-bran and U-lé.\* They had several decked boats useful for service on the rivers and creeks, and did not wait to be attacked in the city, but fought a battle outside. The army of the king of Pegu suffered severely, but in a second action this check was retained, and the two commanders of the Mataban army, fearing to enter the city, fled in decked boats to the Kulá country. Byát-ta-bá appears to have accompanied them. The citizens at once submitted, and Rádzádirit coming to Muttamá appointed governors to it, and to Maulamyáing. These events occurred in the year 750 (A. D. 1388), and the king then returned to Pegu.

Rádzádirit now determined to attack Láuk-byá in Myáung-myá. He went against that place with a large force, but finding it too strong, he advanced against Pu-thin (Bassein), where Láuk-byá's three sons commanded. He attacked, but the foreign decked boats were armed with fire-arms, and the Pegu force lost many killed and wounded. The general was among the former. His body was brought away and buried by the king's command at the foot of the Ta-kun pagoda. The Pegu force retreated towards Myáung-myá. The Puthin force being very strong in boats, followed under the command of Láuk-shin, one of the sons of Láuk-byá, but suffered a defeat. The king remained at Dala to direct operations and a portion of Láuk-byá's force was destroyed; he himself was made prisoner and Myáung-myá surrendered. The king then pushed on to Pu-thin, and Láuk-shin put all his valuables on elephants, intending to join the king of Prome. But being intercepted, he crossed the mountains into Arakan, and went to Than-dwé. An army followed and demanded that he should be given up. The governor surrendered him, and he was made a pagoda-slave at the Shwé-dagun. His wife being of the royal family, was spared and sent to Muttama. This was in the year 752, A. D. 1390. The

\* From the decked boats and the names of the commanders, which are probably Ibráhm and 'Alf or Walf, there evidently were foreigners in high command at this time. No mention is made of fire-arms in these operations, but immediately afterwards there is, in the account of the attack on Bassein.

king now beautified the city of Hantháwati. In the following year he collected a force at Pu-thin, with which he advanced against the city or fort of Ku-dwut on the frontier, which had been occupied by the king of Burma. The Burmese retired on his approach, and he strengthened the place. During his absence he suspected his eldest son of conspiring against him and had him put to death. The prince died protesting his innocence, and openly wishing that he might be born king of a neighbouring country to take his revenge for this injustice.

The king of Siam sent a white elephant and a letter, acknowledging Rádzádirít as being of the same race as himself. Soon after, the king of Ava came suddenly to attack the fort of Ku-dwut. An army was sent to support the garrison, and the king of Burma retired. Rádzádirít now had leisure to attend to the affairs of his kingdom.

The king of Ava, Meng kyí-tswá Tsau-ké, died, and was succeeded by his son Tsheng-phyú sheng. But he was soon after murdered, and his brother Meng Kháung was placed on the throne in the year 763. About this time, we learn from the histories of Arakan and Burma, that a quarrel arose between those two countries, though the causes are not distinctly stated. In the former it is related that, in the year 756 (A. D. 1394), the king of Arakan marched to attack the Burmese territory. But in the latter history, this event is placed in the year 765, which agrees better with the chronicles of Pegu.\* From whatever cause this difference of date may have arisen, it is certain that, about the latter period, the king of Burma being engaged in a dispute with Arakan, and also, as the history of Pegu states, from discontent existing in the southern provinces, Rádzádirít thought he saw his opportunity to take revenge for the invasions of Meng kyí-tawá Tsaukó. He assembled a large army, and a flotilla of boats to proceed by the Eráwati. There were four thousand boats of every description. The army moved partly by land and partly by water. The king himself left the city in the month Natdáu 766, A. D. 1404. He proceeded up the river, the army reached Prome, which was held for the king of Ava by Byan-khyi, one of the sons of Láuk Byá. The town was too strong to be attacked, and the king pushed on for the capital. By means of his large flotilla and army combined, he was able to invest the capital, but could make no impression on the walls. Rádzádirít had full command of all the country outside the city, and even sent a strong detachment up to Tagáung, the ancient capital. Probably he found himself in a difficulty and was glad to retire, but the history states that he did so in compliance with the representations of an eloquent Buddhist monk. He built a monastery at Shwé-kyet-yet, near Ava,

\* See History of Arakan, Jour. As. Soc. of Bengal, for 1844; and History of the Burma Baco, Vol. XXXVIII. for 1869.

with materials obtained by breaking up some of his boats; but this was afterwards burnt by order of Meng Kháung. The king on his way down the river was much annoyed by the Burmese troops; and on reaching Tsalé, he heard that his daughter who had accompanied her husband on the expedition, had been taken prisoner. At first in his rage he determined to attack Prome, but his general Amát Din pointed out that the army was disordered and required rest. He, therefore, proceeded down to Pegu. Arrived at Dala, he put to death Tsáu-ma-shet, his son-in-law, who had fled when his daughter was captured. The king then returned to the city. But his anger had not subsided. No sooner was the rainy season at an end, than he gathered his forces, and advanced up the river. Determining to reduce Prome, he established his headquarters on the western bank of the river. Having defeated a Burmese force near the city, he posted three regiments on the ground to the north, on the Naweng River, in order to prevent any relief arriving. But the king of Ava was now marching down with a large army. Rádzádirit was urged by his general to withdraw the three detached regiments; but he was persuaded by others to let them remain intrenched where they were. They were attacked and utterly overwhelmed by king Meng Kháung, who then relieved Prome. But though the king of Ava was thus successful, the king of Pegu by means of his flotilla cut off his supplies by river, and destroyed the towns and villages on the banks as far as Magwé and Malun. Meng Kháung then proposed that they should make peace, and presents and friendly messages were exchanged. They swore friendship at the great pagoda of Prome, and the boundary of their kingdoms was fixed a little to the south of the city. Yet notwithstanding this agreement, the king of Ava took offence at a Taláing garrison being left at a post on the frontier, and before long began to take measures for disturbing Pegu. He desired to attack Arakan, and to prevent the king of Pegu from interfering, sent a letter to the king of Zimmé, requesting him to march an army to the frontier of Tsit-tung. This letter was intercepted, and the bearers of it were put to death. The king also knowing that preparations were being made for a march into Arakan, sent an army to Pu-thin (Bassein), to be ready for whatever might be required. The Burmese army marched into Arakan, and the king of that country fled to Bengal.\* His son Na-ra-mit-hlá came south to Thandwé, and communicating with Rádzádirit crossed to Pu-thin. The king then promised to support him, and sent on his army to Thandwé. Ká-ma-rú, the son-in-law of Meng Kháung, had been appointed governor of Arakan, with the title of Anau-ra-htá. He was at the

\* This event is stated in the history of Arakan to have occurred in the reign of Meng-tsu-mwun in the year 768, A. D. 1406. See History of Arakan, A. S. Bengal, for 1844.

capital in the northern part of the kingdom. The Taláing army marched there, the Arakanese Prince accompanying it. Kámarú fled from the capital, but he was taken prisoner with his wife and family, and sent to Bassein, where Rádzádirit still was. As his father-in-law had broken the treaty without cause, he was put to death, and his wife, the daughter of the king of Ava, was made one of the queens. Prince Na-ra-mit-hlá was placed on the throne of Arakan, and the Taláing army returned.

During these transactions Meng Kháung had been employed in putting down a rebellion among the Shans of Bamáu and other states. When he heard that his son-in-law and daughter were prisoners, he assembled an army, chiefly Shans from Kalé and Monyin, and moved on Pegu. He marched by the Ra-mé-then route, and thence down the valley of the Paung-láung. Rádzádirit collected an army to meet the enemy at the frontier of his kingdom. The Talaings met with a defeat, and were forced to abandon a fortified post at Tha-kyin, where they had much rice stored. Rádzádirit retreated to Pan-gyán. The Burmans as they advanced burnt all the villages, and the Taláings harassed the enemy by cutting off his foraging parties. When the seat of war reached the low country where the tides prevail, the Shans unaccustomed to them became bewildered, and a large body of them being inveigled on to a sand bank in the river, was suddenly overwhelmed in the rising water. This success, and reinforcements which reached Rádzádirit from Bassein, encouraged the Taláings, and the Shan army began to suffer from the want of supplies. King Meng Kháung, by the advice of his officers, thought it prudent to negotiate. He, therefore, wrote a letter adverting to his daughter being with Rádzádirit, and proposing that his son should marry a daughter of the latter. But the king of Pegu knew that the Burmese army was in distress, he therefore returned a rough answer. Several messages passed, and a personal meeting was agreed to. The king of Pegu had determined to seize his enemy, and Meng Kháung at the last moment, suspecting treachery, turned back. La-gwun-in, a Taláing officer, now undertook to capture the king of Burma. By a sudden night attack he penetrated to the tent of the king, and even possessed himself of the royal sword and pán box. Meng Kháung escaped by an accident, and now being thoroughly alarmed commenced a retreat. He was followed to the frontier by the Taláing army, after which Rádzádirit returned to his capital in triumph. But though thus successful, he deemed it expedient to enter into an alliance with the king of Ava. He, therefore, sent him a letter full of friendly words with presents, and asked for his sister in marriage. After some delay this was agreed to. The princess Wimála Devi went down the river in a royal boat, and was received by Rádzádirit at Ta-kun (Rangun), where the marriage was solemnized. But this alliance was of no avail to

preserve peace. Not long after, prince Thid-dát, brother of Meng Kháung, conspired against the king, and being discovered, fled to Pegu. There he was received with distinction, and he induced Rádzádirít to withhold an annual gift of thirty elephants, which he had promised to send to Ava. Meng Kháung, enraged at this breach of faith, determined at once to attack Pegu. In vain his ministers represented that the rainy season was at hand, and a campaign in Pegu hazardous. The king would brook no delay. Pushing on heedlessly at the head of a body of cavalry, he was suddenly attacked by the Talaing general, with whom was prince Thid-dát. The king of Ava was entirely defeated, and escaping from the field with difficulty, retreated to his own country. Rádzádirít enraged that his enemy had eluded his grasp, for Thid-dát had promised to capture his brother, put the prince to death. The king of Ava made another attack after the rainy season of 767 (A. D. 1405), but it was unsuccessful. At this time it is stated that Rádzádirít had some Europeans in his service.

A more formidable invasion was now preparing than any yet hurled against Pegu. The army was placed under the command of the king's son, Meng-ré-kyau-tswá, who was now seventeen years of age. The story of the marvellous birth of this young prince is told without any doubt of its truth. At the time when Rádzádirít was employed in the Myoung-mýá district against Láuk-byá, he suspected, as has already been mentioned, that his son Báu-láu-kwon-dáu, who was at the capital, was conspiring to usurp the throne. He caused him to be put to death. But the young prince was innocent, and in dying invoked the powers of nature, that he might be born again in a neighbouring kingdom, and revenge his unjust death on his father and his country. Transmigrating, he was born of one of the wives of Meng Kháung, and from marks indicating future greatness received the name of Meng-ré-kyáu-tswá.\* Now in the year 768,† he was appointed to command the invading force, which by land and water numbered twenty thousand men. The prince proceeded down the Eráwati and entered the Bassein District, where he captured a stockade which had lately been built at De-ba-thwé. At this time Rádzádirít was detained at Muttama, which was threatened with an attack by the Shans of Zimmé. The prince next attacked Myoung-mya, which was so well defended, that he was obliged to retire. He also failed against Bassein and Khé-báung. The following year he marched across the hills into Arakan. The king of that country, Naramit-hlá fled, and the prince ap-

\* The same story is told in the Burmese history. See Jour. A. Soc. Bengal, Vol. XXXVIII.

† Year 772, by the Burmese history.

pointed governors to Arakan\* and Thandwé, and then returned to Ava. The danger from the Shans of Zimmé having passed, Rádzádirít returned to his capital. As Naramit-hlá was the hereditary king of Arakan, the king of Pegu determined to restore him. He sent a force which occupied Thandwé. They then heard that the king of Arakan had fled to Dacca. The Burmese prince now returned with an army to retake Thandwé, but by a false report of a large army approaching, retired. Soon after, a relieving force did arrive from Muttama, and the commanders who had held Thandwé, pushed on to the capital of Arakan, which the Burmese governor abandoned and fled.

At this time Prome was held for the king of Ava by a son-in-law of Láuk-byá. Rádzádirít thought there was an opportunity to take the place, as the prince of Ava was engaged against the chief of Thein-ni. He advanced up the river in the month Nát-dáu, 774 (A. D. 1412), but was almost immediately recalled by news of Muttama being threatened by an attack from Siam. He at once returned with a part of his army, leaving his son Binya Pathin as Commander-in-Chief. That officer deemed it prudent to retire from Prome. He, therefore, stockaded himself at Tha-lé-tsi, on the west bank of the river. The king of Ava soon arrived with an army at Prome, and a month later Meng-ré-kyáu-tswá joined him. They made an attack by land and water on the fort at Tha-lé-tsi. But the Taláing garrison had firearms in abundance, and destroyed numbers of the enemy, and the rest were driven back in confusion. The Burmese king then blockaded the work. King Rádzádirít approached with an army, and it was agreed to have a fair fight between two war boats, one on either side. La-gwun-in commanded the boat on the Taláing side, but he was overcome and killed by a treacherous attack from four Burmese boats, under Meng-ré-kyau-tswá. After this, the king of Pegu commenced a retreat. The Burmese prince followed by water and attacked the Taláing flotilla near Tarukmáu. Both sides suffered severely, but Rádzádirít hastened the retreat of his army by land and water, and himself went on ahead with his body-guard. The Burmese army followed, and, entering the delta, successively occupied Dala, Ta-kun, Than-lyeng, and Mháu-bí. Rádzádirít entrenched himself at Kha-má-byín. For several months the two armies were engaged in various combats until the Taláing army gained a victory over Meng-ré-kyáu-tswá. The Burmese army then retreated.

In Arakan the Taláing commanders having heard that their king had suffered a defeat, evacuated that country, and brought their army to Bassein. Rádzádirít suspected that one or both of these officers had been bribed by the king of Ava. One of them was put to death, but the other

\* In the history of Arakan this event is recorded in the year 768.

was promoted. The king of Pegu now repaired the defences of his principal towns and cities.

When the rainy season had passed, a Burmese force once more came down by land and water. It consisted of not less than 100,000 men, 300 elephants, and 3000 horses. The king of Arakan who had been placed on the throne of that country by Meng Kháung, appeared as commander of one of the divisions. The Prince Meng-ró-kyáu-tswá, who was Commander-in-Chief, proceeded down the Bassein River and took Khé-báung by storm, in the month Tabodwé, 775 (A.D., 1413). The Taláings, however, determined to hold out in every place, and one of the king's sons had his head-quarters at Pan-go. Their superiority in boats enabled them to intercept the communications of the Burmese, and to cut off their supplies. The king of Táung-ú marched down with a force to create a diversion, but was met and checked on the frontier. The prince of Ava, though long inactive at Khé-báung, at length left it and proceeded towards Pan-go. The Talaings dared not attack him. He fought an action partly on land and water, and defeated the Talaing army, taking prisoner Tha-min pa-rán. The prince then proceeded to attack Bassein, but after losing many of his men, was obliged to retire. He proceeded next to Myoung-mya hoping to take it, but failed. He then went up to Ava taking with him many prisoners of importance, whom he presented to his father. He then married, and brought his wife Sheng-meng-hlá down to Pegu. He at once proceeded to attack Dala. He did not succeed, but the stars according to the astrologers were so adverse to Pegu, that Rádzadírit retired with all his family to Muttaná. The Burmese prince hearing that the Talaing general Amát-din had left Bassein, suddenly appeared before that city, the governor of which surrendered. Indians and Europeans are mentioned as being in the garrison. The prince then went to Myoung-mya, which also surrendered, and having built some decked boats proceeded to attack Than-lyeng. It was defended by Binyarán, a son of the king's, and the attack failed. The prince then returned to the entrenched position he had established not far from Dala, and closely invested the Taláing force there. At this time, the king of Ava was attacked by a Chinese army, and the dispute was settled by a duel between a Chinese champion and the Talaing officer Thamínparán who had been taken prisoner, as already related.\* Dala was gallantly defended by the Taláings, though they were starving. The king of Pegu recovering from his alarm returned to his capital and determined to relieve Dala. As he approached, the Burmese prince drew off his force, and the king sending a few men into the city, followed the prince's army. Several days of skirmishing occurred, and at length when the Burmese head-quarters were

at Tsha-bó-tsha-kan, the prince prepared for battle. He gave his elephant three cups of spirit and drank some himself, then remarking to his wife that the cry of the *sarus* which he heard was a good omen, he went forth. In the battle which ensued, the prince received a mortal wound, and his army fled. Rádzádirit ordered that he should be buried with royal honours. The Burmese army now retired, and, on the retreat, the Prince's wife Sheng-meng-hlá was taken prisoner. It is said that king Meng Kháung himself came down to Dala and was shown the spot where his son's bones had been buried. He then had them put into a golden vase and sunk them at the mouth of the river. Again in the following year 776, (A. D. 1414) he came with an army, but though he defeated and took prisoner Binya Tsek, one of the king's sons, the expedition failed, and he returned to Ava. This was the last invasion of Pegu during the reign of Rádzádirit. Both nations were exhausted by the destructive wars they had waged. King Meng Kháung died five years later, and Rádzádirit devoted himself to religion and good works for the rest of his days. He opened communication with the king of Ceylon, whose daughter he married, and from whom he received a tooth relic which was enshrined in a pagoda 186 cubits high. He also repaired the Shwé máu-dáu pagoda, to which he gave a new hti. Though no longer active, he one day went out into the jungle to capture a wild elephant. When throwing the noose, he received a blow from the animal which broke his leg, and he died before he could be brought home. This was the end of Rá-dza-di-rit, in the year 783 (A. D. 1421).

No. 1.—*List of the kings of Suvarna Bhumi, or Tha-htun, from the native chronicles.*

- |                        |                               |
|------------------------|-------------------------------|
| 1 Thi-ha Rá-dzá. ....  | The first king. He died the   |
| 2 Thiri Dhammá Thauka. | year Gautama entered Nirvana, |
| 3 Titha.               | B. C. 543.                    |
| 4 Dhammá Pá-la.        |                               |
| 5 Dham-ma dhadza.      |                               |
| 6 Eng-gu-ra.           |                               |
| 7 Uba-de-wa Meng.      |                               |
| 8 Thí-wa-rít.          |                               |
| 9 Dzau-ta-kummá.       |                               |
| 10 Dham-má Thau-ka.    |                               |
| 11 Uttara.             |                               |
| 12 Ká-tha-wun.         |                               |
| 13 Mahá-thá-la.        |                               |
| 14 A-ra-ka.            |                               |
| 15 Na-ra-thú-ra.       |                               |
| 16 Ma-há-Bad-da-ra.    |                               |



- 17 A-da-ra.
- 18 An-gu-la.
- 19 U-run-na-ta.
- 20 Mahá Thuganda.
- 21 Thuganda Rádzá.
- 22 Brahmadát.
- 23 Manyá Rádzá.
- 24 A-di-ka.
- 25 Ma-rá-di Rádzá.
- 26 Tha-du-ka.
- 27 Dham-ma bi-yá.
- 28 Thu-da-thá.
- 29 Dip-pa Rádzá.
- 30 A-thek-ka Rádzá.
- 31 Bhum-ma Rádzá.
- 32 Man-da Rádzá.
- 33 Ma-hing-tha Rádzá.
- 34 Dham-ma tsek-ka-ran.
- 35 Thu-tsan ba-di.
- 36 Bad-da-ra Rádzá.
- 37 Na-ra-thú Rádzá.
- 38 Tsam-bú-dí-pa.
- 39 Ke-tha-rit Rádzá.
- 40 Wi-dza-ya Kum-má.
- 41 Ma-ni Rádzá.
- 42 Tek-ka meng
- 43 Ku-tha Rádzá.
- 44 Dip-pa Rádzá.
- 45 Na-ra Rádzá.
- 46 Rá-dzá Thúra.
- 47 Tsit-ta Rádzá.
- 48 Di-ga Rádzá.
- 49 Ut-ta-ma Rádzá.
- 50 Thi-ri Rádzá.
- 51 Dham-ma Rádzá.
- 52 Má-há Tsit-ta.
- 53 Gan-da Rádzá.
- 54 Dzé-ya Rádzá.
- 55 Thu-ma-na Rádzá.
- 56 Man-da-ka Rádzá.
- 57 A-min-na Rádzá.
- 58 U-din-na Rádzá.
- 59 Ma-ná-ha Meng.\*

\* Manúha (No. 59) was king of Tha-htun when the city was taken and destroyed by Anau-rahtá, king of Pagan, about the year A. D. 1050.

No. 2.—*List of the Kings of Pegu from the foundation of the city.*

| NAMES OR TITLES OF KINGS. |                                        | Commencement of reign. |       | Length of reign—years. | Relationship of each succeeded. | REMARKS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|----------------------------------------|------------------------|-------|------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |                                        | Year of religion       | A. D. |                        |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.                        | Mahimu Thamala Kumára,                 | 1116                   | 573   | 12                     | ...                             | Came from Thahtun to build the city of Pegu.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2.                        | Wimala,                                | ...                    | 585   | 7                      | Brother.                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3.                        | Kathá Kum-ná,                          | ...                    | 592   | 7                      | Nephew.                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4.                        | Mahimu Arinda Rádzá,                   | ...                    | 599   | 7                      | Son.                            | ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 5.                        | Mahintha Rádzá,                        | ...                    | 606   | 17                     | Son.                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 6.                        | Gainda Rádzá,                          | ...                    | 623   | 12                     | Brother.                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 7.                        | Mahimu Mig-ga dib-ba Rádzá,            | ...                    | 635   | 15                     | Son.                            | Relationship not stated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 8.                        | Gits-tsa-wi-ye,                        | ...                    | 650   | 10                     | Son.                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 9.                        | Kara-wi-ka Rádzá,                      | ...                    | 660   | 12                     | Son.                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 10.                       | Tsan-da-la Rádzá,                      | ...                    | 672   | 13                     | ...                             | Ditto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 11.                       | At-ta-thá Rádzá,                       | ...                    | 685   | 15                     | ...                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 12.                       | Anuma Rádzá,                           | ...                    | 700   | 12                     | Son.                            | Usurper.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 13.                       | Mahimu Mig-ga-dib-ba ngé,              | ...                    | 712   | 10                     | ...                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 14.                       | Mahimu Bega Thamanda Rádzá,            | ...                    | 722   | 12                     | Brother.                        | Relationship not stated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 15.                       | Ube-na-la Rádzá,                       | ...                    | 734   | 12                     | Son.                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 16.                       | Pun-na-ri-ka Rádzá,                    | ...                    | 746   | 15                     | ...                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 17.                       | Thamin Tik-tha, Titha, or Tissa Rádzá, | ...                    | 761   | 20                     | Son.                            | From this time a blank of about five hundred years occurs in the annals of Pegu, during which the names of no native kings are entered. The two last kings in this list probably represent two periods, the religious ascendancy, or religious strife, of Brahmanists and Budhists, extending over about three hundred years. The close of Titha's reign would then synchronize with the conquest of Pegu and Thahtun by Anaurahtá about A. D. 1050, when Pegu became subject to Burma for about two hundred and thirty years. |

(To be continued.)

*Postscript to Bábu RA'JENDRALA'LA MITRA'S Paper on Spirituous.  
Drinks in Ancient India.*

It has been stated on page 7, that a "fatted calf" was once slaughtered for the entertainment of Ráma, but no notice has been met with of his having been offered any liquor. I find, however, that he was not averse to drinking. The following extract from the last book of the Rámáyana shows that he and his exemplary wife, Sitá, were as much given to drinking as other people of their time. The passage runs thus: 'Embracing Sitá with both his hands, Kákutstha (Ráma) made her drink pure Maireya wine, even as Indra makes Sachí partake of nectar. Servants quickly served flesh-meat variously cooked, and fruits of different kinds for the use of Ráma. Hosts of Apsaras, proficient in singing and dancing, and accomplished and handsome damsels, exhilarated with wine, danced and sang for the entertainment of Ráma and Sitá.' It is said that it was the usual every-day practice of Ráma, to devote his evenings to this feasting and musical entertainment as a fitting sequel to his onerous regal duties of the forenoon.

\* सीतामादाय बाहुभ्यां मधु मेरेयकं श्रुचि ।  
पाययामास काकुत्स्थः शचीमिक्षा यथामृतं ॥ ११ ॥  
मांसानि च सुसृष्टानि विविधानि फलानि च ।  
रामस्याभ्यवहारार्थं किङ्कराङ्गमाहरन् ॥ १२ ॥  
अप्सरोगणसङ्घाच्च मृत्युमोतविभारदः ।  
दक्षिकारूपवत्यश्च स्त्रियः पानवद्गं गताः ॥ १३ ॥  
उपास्यन्त रामस्य सीताया चर्चवर्जनाः ।

On page 11 the word "reference" at the end of line 1 should be read "references," and "won over over" at the beginning of line 28, should be "won over." On page 13, "especially" at the beginning of line 14, should be "especial."



*Essays in aid of a Comparative Grammar of the Gaurian Languages.*—By  
REV. A. F. RUDOLF HOERNLE, D. Ph. Tübingen, Professor of Sans-  
crit, Jay Náráyan's College, Benares.

(Continued from Journal for 1872, Pt. I, p. 174.)

#### Essay IV.

##### *On the Inflectional base.*

In the third essay I attempted to collect all the facts and phenomena presented by the various Gaurian languages in regard to their inflectional base. These facts were analysed and some general principles deduced from them. Two of these general principles require a more special consideration ; and this will be the subject of the present essay. It has been shown in the 3rd essay, that the inflectional base may (under certain circumstances) assume a two-fold form ; viz. a *direct* form and an *oblique* form. One of the two general principles is closely connected with the *direct* form, the other with the *oblique* form.

One result of the previous enquiry has been to show that the inflectional bases of the Gaurian languages are divided into two great classes according as they admit or do not admit an *oblique form*, and accordingly they were divided into 1., the Prákritic, and 2., the Gaurian (including Gaurian proper and Sanskritic) nouns, *i. e.*, into those which have retained traces of the Prákrit *organic* declension, and those which have emancipated themselves of it altogether. This conclusion, however, was mainly dependent upon the truth of the identity of the *oblique form with the organic genitive of the Prákrit*. This principle I shall try to establish now.

Another result of the previous enquiry has been to show that while some inflectional bases retain in their *direct form* the original Prákrit termination णि, others reduce it to ण or ण्. This difference was explained by the theory that the former are derived from a *particular* Prákrit base ending in ण्ण (or ण्ण), while the latter are derived from the *general* base in ण्. The truth of this principle will be the second point I shall endeavour to establish. But the facts upon which the proof of both, this and the other principle, depends, are so closely intertwined, that it will not be possible to keep both enquiries altogether distinct.

It is a well known fact, that in Sanskrit the genitive is not uncommonly substituted for the dative, though it possesses an *organic* dative ; (cf. Pāṇini 2, 3. 5., M. Williams's Sanskrit Grammar §, 816, A. p. 353). In Prákrit this rule has become absolute (see Cowell's Prákrit Prakāsa VI. 64.) ; and necessarily so ; for it has lost the *organic* dative altogether ; and not possessing one, it is obliged either to paraphrase it (by postpositions, *e. g.*,

प्रति, जने, चर्चे, etc.), or to substitute (according to the precedent of Sanskrit) the genitive. The latter is on the whole the more common course.\* The Gaurian languages which have received their grammatical system from the Prākṛit (or, at all events, not from the Sanskrit), it is manifest, cannot possess an organic dative; and, it is more than probable, a priori, that what passes in them for the dative is (according to the precedent of Prākṛit) either a paraphrase of the dative or a substituted (organic) genitive. The former course, viz. to paraphrase the dative by postpositions, as is well known, has become the almost universal rule in the Gaurian.† The only exception (barring isolated instances in other languages) is in the Marāṭhī. This language possesses by the side of the ordinary paraphrastic datives (formed with the postpositions ला, प्रत, अबल, करिनां, etc., cf. Manual, pp. 17, 18,) a form of the dative ending in स which has all the appearance of being an organic case-form; e. g., dative of देव God is देवास (besides देवाला, etc.); of कवि poet it is कवीस (besides कवीला, etc.); of गुरु it is गुरुस (besides गुरुला, etc.). This dative in स is generally admitted (cf. Manual, pp. 132, 133), and can easily be shown to be nothing but the organic genitive of the Prākṛit. For the genitive of देव, कवि and गुरु in Prākṛit is देवस्स, कविस्स, गुरुस्स (cf. Prāk. Prak. V. 8, 15). Now I have already explained in the 2nd Essay that in the later Prākṛit and in Gaurian, one of two similar compounded consonants is elided and the preceding vowel lengthened (see Prāk. Prak. III, 58.). Accordingly the genitive of the pronoun जो (base ज) in Prākṛit is masc. जस्स or जास, fem. जस्सा or जाने (or जार); of the fem. base जि the gen. is जिस्सा or जीने (or जीर); see Prāk. Prak. VI. 6, 6.‡ According to the

\* Examples from the Sakuntalā :

का तुमं विसज्जिद्वस्स वनिव्वस्स वा ॥ i. e.

Skr. का त्वं विसृज्याय रोदयाय वा ॥

Or. अशुजावाहि सो उडजगममस्स ॥ i. e.

अशुजावाहि न उडजगमनाय ॥

From the Uttara Rāmcharita :

बनो तपोधराचं बनो रघुजदेवदाणं ॥ i. e.

Skr. नमः तपोधनेभ्यः नमो रघुजदेवताभ्यः ॥

Or. अविषदरं मम मकाराधो कुविस्सदि ॥ i. e.

Skr. अधिकतरं मम मकाराजः कोपिष्यति ॥

† The regular process of glottic development from Sanskrit to Gaurian is here, worth noting; the dative is expressed in the

Sanskrit by the dative or genitive;

Prākṛit by the — genitive, or paraphrase;

Gaurian by the — paraphrase.

‡ The same is the case with the Māgadhī Prākṛit genitive in वा; e. g., Skr. पुरुषस्स is in M. Prāk. पुलिमाव. Here व is the modification of an original स, so that पुलिमाव stands for पुलिमास and this for पुलिमस्स, just as देवास for देवस्स which in M. Prāk. would be देवाव (cf. Pr. Prak. XI, 12.)

analogy of the pronominal forms जास for जस्स, जोसे for जिस्सा, the Prakrit genitives देवस्स, कविस्स, गुरुस्स, etc., become in the Gaurian देवास, कवीस, गुरुस. etc., i. e., the forms which we see in the Marāṭhī. The original genitive character of the Marāṭhī dative in स is further proved by the dative formed by means of the so-called postposition साठी; e. g., देव. has a dative देवासाठी besides देवास or देवा ला; or कवि has कवीसाठी beside कवीस or कवीला; गुरु has गुरुसाठी beside गुरुस and गुरुला. These forms (as देवासाठी, कवीसाठी, गुरुसाठी, etc.) have always been derived thus; देवा (base) + साठी (postposition), कवी + साठी, गुरु + साठी under the mistaken notion, that as देवा, कवी, गुरु, etc. are the bases in all the other cases (e. g., instr. देवा + ने, dative देवा + ला, abl. देवा + हून, etc.), the same base must be contained also in the forms देवासाठी, etc. But it has never been shown what the meaning and derivation of the word साठी might be. The truth is, that साठी is no word at all; and that the forms देवासाठी, etc., have been wrongly divided. They ought to be separated thus; देवास (base) and साठी postposition, कवीस + साठी, गुरुस + साठी, etc. The postposition साठी is the Prakrit and Gaurian equivalent of the Sanskrit अर्थे which, however, in the Gaurian may also be modified to आर्थी and hence the Marāṭhī has beside देवास + साठी also देवा + आर्थी (compare Skr. स्थाने which becomes in Mar. and Beng. ठाई, in Hindi and Panj. तारी). Hence देवासाठी, i. e. देवास साठी stands for Skr. देवस्य अर्थे or Prak. देवस्स अर्थस्मि; again कवीस साठी is = Prak. कविस्स अर्थस्मि = Skr. कवेर अर्थे; again गुरुस साठी = Prak. गुरुस्स अर्थस्मि, Skr. गुरोर अर्थे.

So far then it is plain that the Marāṭhī dative ending in स is in reality the *organic genitive* of the Prakrit.\* Now in old Marāṭhī poetry another dative form has been preserved which ends in आ, e. g., ईश्वर God, dative ईश्वरा (see Manual, p. 138). There can be no doubt that this form in आ is but a further modification or corruption of the more original and more perfect form in स; that, e. g., ईश्वरा is a curtailment of ईश्वरास. It may have arisen thus; in the Gaurian a final short vowel is not pronounced, so that the

\* In the oldest Hindi of Chand Bardai instances of this *organic genitive* in स, which in the modern Marāṭhī only occurs in the sense of the dative, are still found with their original Gen. sense; e. g.,

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| तास राज समोष ।                    | Or. रति करन झोलनच राज घास ।           |
| रखी नठ बिदुया उचार ।              | न न संस धोर न न दुष तास ॥             |
| i. e. Skr. तस्य राज्ञः समोषे etc. | Skr. नहि मन धीरं नहि दुषं तस्य ॥ etc. |
| Sasivrittā Kathā XXV. 16.         | Ibid. XXV. 36.                        |
| Or. सोमवंस जह्न वपति ।            | Or. ता पद दु पाव अनेक गुन ।           |
| देवगिरि जसि जीस ॥                 | रघु दु तहां गिरि दीध पर ॥             |
| Skr. देवगिरिर् यमो यस्य etc.      | Skr. तस्य मये कन्या अनेकगुणवती etc.   |
| Ibid. XXV. 16.                    | Ibid. XXV. 16.                        |

consonant which precedes it, is virtually the final of the word; now most probably the consonant ष of the dative first changed to व (a change, which is supported by the Māgadhi Prākṛit genitive in वाव, see note on page 60 and Prāk. Prak. XI. 12), and then the व becoming the virtual final sound of the word was dropped; thus ईशवास become first ईशवाव (or virtually ईशवा) and finally ईशवा. Any one by pronouncing both ईशवाव and ईशवा, may see how easily one passes into the other. It follows thus, that the dative form in वा, being merely a modification of the fuller dative form in वास, is also really the *organic genitive* of the Prākṛit.

Now this genitive form in वा which has been preserved in the dative of the old Marāṭhī, has been lost in modern Marāṭhī, but it is preserved in the latter as well as in the former as the *inflexional base of all cases formed by post-positions*, e. g. देव, "God," has old and modern dative देवास, old dative देवा, (old and modern) instr. देवा ने, dative देवा ला, abl. देवा हून, genitive देवा वा. So far then it is proved, that the *oblique form* in वा of the inflexional base of Marāṭhī nouns in व is identical with the *organic genitive* of the Prākṛit. But further it is manifest that as the nature of the Marāṭhī dative form in ईस and ऊस (e. g., कवीस, गुरुस) is identical with that of the dative form in वास (e. g., देवास), so the nature of the *oblique forms* in ई and ऊ (of the inflexional base of Marāṭhī nouns in र and उ, as कवी वा gen. of कवि, गुरु वा gen. of गुरु) must be identical with that of the *oblique form* in वा of the inflexional base of nouns in व; and in the same manner as the form in वा arose from that in वास, so the form in ई and ऊ must have arisen from those in ईस and ऊस. It follows, therefore, that the *oblique forms* in ई and ऊ of the inflexional base of Marāṭhī nouns in र and उ are identical with the *organic genitive* of the Prākṛit; that is, that, e. g., the *oblique form* कवी of the noun कवि is identical with the Prāk. genitive कविस्स and गुरु with गुरुस्स, etc.

If, as has been now shown, the *oblique form* of the inflexional base of all nouns in व, र, and उ (i. e., by far the greatest part of the whole number of nouns) is identical with the Prākṛit genitives, this fact raises the presumption that the *oblique form* of all remaining inflexional bases will be of the same nature. We will now take the different kinds of *oblique forms* of inflexional bases in Marāṭhī and afterwards in the other Gaurian languages one by one and show that that is really the case.

a. The inflexional base of all Marāṭhī nouns (masc. fem. and neut.) in र and उ, and of all Mar. nouns (masc. and neut.) in व has an *oblique form*, respectively, in ई and ऊ and वा. These, as has been already proved, are Prākṛit genitives.

b. The inflexional base of *feminine* nouns in व, has an *oblique form* either in ई or in र. Those nouns which have an *oblique form* in ई, are, as I have shown in Essay III., really feminine nouns in र. They belong,

therefore, to the former class, and their *oblique form* in ई is a *Prākṛit genitive*. Those nouns which have an *oblique form* in ए are, as has also been shown in Essay III, really *Prākṛit feminine nouns* in आ. The *Prākṛit genitive* of these nouns ends in आर, which in Gaurian might become एर (the final आ being reduced to ए as in the Nom. and Acc. cases), and this, finally, is contracted by regular Sandhi (cf. *Prāk. Prak.* IV. 1.) into ए; e. g., जीभ *tongue* has gen. जीभे; in *Prākṛit* it is जीभा (or जीहा = *Skr.* जिह्वा, cf. *Prāk. Prak.* I. 17, III. 51); Gen. जीभार, in Gaurian जीभर, contracted जीभे (as in Bangālī बाघ + एर = बाघेर, Gen. of बाघ *tiger*).

c. All Marāṭhī nouns ending in consonants (masc. fem. or neut.) are treated as ending in अ, and hence the *oblique forms* of their inflexional bases end either in आ or in ई or in ए, and are, therefore, *Prākṛit genitives* formed according to the analogy of the real nouns in अ. All these nouns in consonants are either Sanskritic or foreign; but never derived from the *Prākṛit*, as no *Prākṛit* word may end in a consonant, see *Pr. Prak.* IV. 6—II. 18. Their treatment has been explained in Essay III.

d. The inflexional bases of Marāṭhī nouns (masc. or fem.) in ई, ऊ, ए, ऐ, औ, औ, and neuter nouns in ऊ have no *oblique form* at all. As regards the few exceptional masc. nouns in ई and ऊ and neuter nouns in ऊ, see the next paragraph.

e. There remain the masc. nouns in आ to which correspond fem. nouns in ई and the neuter nouns in ई; the masc. nouns in ई to which correspond fem. nouns in ई and the neuter nouns in ई; and the masc. nouns in ऊ to which correspond the fem. nouns in ऊ and the neuter nouns in ऊ. The inflexional base of the first two kinds of nouns has an *oblique form* in आ (masc. and neuter) and in ऐ (fem.). The inflexional base of the third kind has an *oblique form* in आ (masc. and neuter) and ऐ (fem.). The explanation of these *oblique forms* is more complicated. They are, as I shall show, the organic genitives of *Prākṛit* nouns formed by the affix क (masc. and neuter,) and का (fem.). It will be necessary to dispose first of the latter question; viz. the presence in the Gaurian languages of a class of nouns which are descended from *Prākṛit* nouns formed by the peculiar *Prākṛit* affix क (cf. *Pr. Prak.* IV, 25.) Here I will only draw attention to an important coincidence. Masculine and neuter nouns in अ have (as has been shown) an *oblique form* in आ (being the corruption of the *Prākṛit* genitive in अस्). Their corresponding fem. nouns in अ have an *oblique form* in ए (being a corruption of their *Prākṛit* genitive in आर). Similarly we have here masc. and neuter *oblique forms* in आ and आ and their corresponding feminines in ऐ and ऐ. The conclusion may be drawn that the masc. nouns in आ and ई and the neuter nouns in ई and ई which yield the *oblique form* in आ, were originally masc. and neuter nouns in अ or अ = एअ or एअ = एअ or एअ; and that their *oblique form* in आ is a cor-



ruption of a Prākṛit genitive in वस्स (= वसस्स = वकस्स). Again, that the feminine nouns in ऐ which correspond to the masc. nouns in आ and ई and to the neuter nouns in ऐं and ईं, and which yield the *oblique form* in ऐ, were originally feminine nouns in वा = वसा = वका; and that their *oblique form* in ऐ is a corruption of a Prākṛit genitive in वार = वसा = वकार. Similarly it may be concluded that the masc. nouns in ऊ and neuter nouns in ऊं which yield the *oblique form* in वा, were originally masc. and neuter nouns in व or वं, *i. e.*, in उव or उवं = उक or उकं; and that their *oblique form* in वा is a corruption of a Prākṛit Genitive in वस्स = उवस्स = उकस्स; and again that the feminine nouns in ऊ which correspond to the masc. nouns in ऊ and neuter nouns in ऊं, and which yield the *oblique form* in वै, were originally fem. nouns in वा, *i. e.*, in उवा = उका; and that their *oblique form* in वै is a corruption of a Prākṛit genitive in वार = उवार = उकार. As regards the *oblique form* in ए or आ of the inflexional base of certain nouns in the Hindī-class Gaurian languages, their case is exactly like that of the last mentioned class of Marāṭhī words. The two classes of nouns correspond to each other in the two classes of Gaurian languages, *e. g.*, Hindī घोड़ा *horse*, obl. घोड़े, is in Marāṭhī घोड़ा, obl. घोड्या. And their *oblique forms* must therefore have the same nature, and must admit of the same explanation; *viz.* that they are the organic genitive of particular Prākṛit bases formed by the affix. क (*i. e.*, ending in अक).

The evidences showing that there is in Gaurian a class of nouns, which are derived from Prākṛit bases formed by means of the peculiar, *pleonastic* affix क, are the following. In the first place, it may be remarked, that all Sanskrit words which have a base in अक (*i. e.* formed by the affix क) and have passed into the Gaurian through the Prākṛit, terminate in the Gaurian in ओ (औ) or आ, and not in अ or उ; *e. g.*, *horse* is Skr. घोटक, nom. sing. घोटक; Prāk. घोडको or घोडघो, Gaurian घोड़े or घोड़ा;—Skr. कटक: *stiff*, Pr. कडाको or कडघो, Gaurian कड़े or कड़ा;—Skr. चम्पक: the *champaka tree*; Prāk. चंपका or चंपघो, Gaurian चंपे or चंपा;—Skr. बालक: *keeper*, Prāk. बालघो, Gaurian बाले or बाला (an affix);—Skr. धारक: *holder*, Pr. धारघो or धारघो, Gaurian धारे or धारा (an affix).—There are only a small number of nouns of this kind. But on the other hand all Sanskrit nouns, the base of which ends in अ only, and which have passed into the Gaurian through the Prākṛit, terminate in the Gaurian either in ओ (आ) or in अ (उ), evidently according as they did or did not assume, in their passage through Prākṛit, the affix क; *e. g.*, *sweet* in Gaurian (Hindī) is both नीढ and नीडा; both represent the Skr. निढ; but Skr. निढ may be represented in the Prāk. by निहो (*i. e.*, निह) and by निहघो (*i. e.*, निहक); now Prāk. निहो becomes the Gaurian नीढ, and Prākṛit निहघो becomes the Gaurian नीडे (नीडा). Again *heat* is in Skr. वर्त, and *pot* बट; both having bases in अ. In Prāk. they may assume the forms वरसा or वरसघो and बटो

or चडया. But of the former pair the form चड्या became the usual one while of the latter pair चडयो was the usual one. Accordingly we find in the Gaurian *heat* to be घाम, but *pot* to be चडो or चडा. These examples might be multiplied indefinitely.

Next, Sanskrit *masculine* nouns which have a base in च exhibit in the Gaurian a two-fold termination. They either end in यो (यो, या) or in च (च). But a very analogous phenomenon may be observed in Sanskrit neuter nouns in च, with nom. sing. in चम्. They exhibit in the Gaurian a twofold termination ending either in च or in यो, जं, रं, रं; e. g., Skr. गृहम् *house* = Gaur. घर; but Skr. कृतम् *done* = Gaur. केले (Mar.) or कीनो or कियो (Br. Bh.) or कीन् (Alw.); and Skr. वैदिकम् *pearl* Gaur. मोती (Mar.). Sometimes both forms occur in the same word as Skr. कदरम् *plumtree* = Gaur. केड or केले, and Skr. नारिकेलम् *cocoanut* = Gaur. नारड or नारडी (Mar.). But observe the difference. The nom. sing. of those *masc.* nouns ends in Skr. in च; this turns in Prakrit into यो; and this again, in Gaurian, is either retained unchanged यो or reduced to च(च). All this is intelligible; from च: (= चम्) to यो to च, there is a direct progress of phonetic corruption, consistent with the glottic laws regulating the development of younger languages from an older one. But now in the other case; the nom. sing. of *neuter* nouns in Skr. is चं (= चम्) which remains in Prakrit चं or becomes simply च; in Gaurian the Prakrit चं or च is either reduced to (resp. remains) च or is raised to यो, जं, रं, रं.\* Now this is contrary to all principles of glottic development. By whatever other means languages may increase and reconstruct themselves; *phonetically* they disintegrate and *decrease* as they advance. The simple Prakrit termination च or चं can never by itself have been raised or increased to यो or जं or रं or रं. This is utterly inconceivable, nor will any reference to the accent help us here out of the difficulty. The accent might explain the absence of phonetic disintegration, where its presence would be expected, as, e. g., that the Prakrit termination यो remains in the Gaurian, in some cases, यो, instead of being reduced to च; (though even in this case, as I have shown in Essay III, the explanation by the help of the accent is quite inadequate); but it is quite unable to explain the presence of a phonetic increase which is contrary to glottic laws, according to which either phonetic disintegration or at least no change at all ought to have taken place. It

\* E. g. Skr. गृहं, = Prak. घरं or घर, = Gaur. घर. But Skr. कृतं, = Pr. कड or कडं, = Gaur. (Mar.) केले; or Skr. कृतं, = Pr. कियं or कियं, = Gaur. (Br. B.) कियो; or Skr. वैदिकं = Prak. वैदिकं = Gaur. (Mar.) मोती. Or in the same word Skr. कदरं = Pr. केरं or केर = Gaur. केड or केले (Mar.) or केडा (H. Hind); and Skr. नारिकेलं, = Pr. नारिकेलं or नारिकेल, = Gaur. (Mar.) नारड or नारडी. In this last case it is especially obvious that the same Skr. or Prak. form could not have been the immediate source of the two widely different Gaurian forms.

is evident the Gaurian neuter forms in **बौ**, **अ**, **रे**, **रै**, must be susceptible of such an explanation as accounts for the phonetic increase without shutting out the possibility of phonetic disintegration in these same forms.

I think a clue to the right interpretation of these neuters in **बौ** (Hindī Br. Bh.), **बौ** (Hindī Súra Dása), **अ** (Hindī, Alw., and Maráthī), **उ** (Gujarātī and Naipálī); **रै** (Maráthī); **रै** (Maráthī) is given us by the Gaurian infinitives. Let us take, for example, the infinitive *to do* or *doing*. It is in the Low Hindī dialect of the Braj **करबौ**, of Alwar **करनु**, of Súra Dása **करनौ**; in Maráthī **करचे**, in Naipálī **करनु** (or **करनु**?). The common opinion, I believe, is that all these forms are verbal nouns formed by the Sanskrit affix **ञ**, and that their original is the Sanskrit and Prákrit form **करञ**.\* This, as has been shown in the preceding paragraph, is impossible, because it contradicts the glottic laws. Their origin must be a different one. In Maráthī the meaning of the infinitive is only one out of many, and that a subordinate one, of **करचे** and all words of this class. To express the infinitive it has a proper form in **अ**, connected with, though not derived from, the Sanskrit infinitive in **तुं**. The proximate and principal meaning of **करचे** in Maráthī is that of the *Latin* gerund. But Maráthī possesses two forms of the gerund, one in **चे** and another in **वे**; besides **करचे** it has also the form **करावे**; e. g., *incitement to act* is **करणा ची प्रेरणा** and **करावया ची प्रेरणा**. Now if we turn to the Prákrit and Sanskrit we find the origin of these forms. We meet with two Sanskrit affixes forming gerunds, or part. fut. pass., of which latter the gerund is merely a particular usage; viz. **अनीय** and **तव्य**. In Prákrit these become **अनीय** or **अहिय** and **तव्य** (see Pr. Prák. II, 17. VII, 33.). Now it can easily be shown that these affixes will account for the two alternative forms of the gerund in Maráthī. The common Prákrit *prose* representative of the Sanskrit root **कृ** is **कर** (see Pr. Prák. XII, 15.). Of this root we obtain with the affix **अनीय** the gerund **करनीय** (= Skr. **करनीय**), and with the affix **तव्य**, the form **करितव्य** which is the more polished form (enjoined by the Pr. Prák. VII, 83.), or **करतव्य** (= Skr. **कर्तव्य**) which was probably the *vulgar* form of it. In either form (**करितव्य** or **करतव्य**) the medial **व** would become elided (according to the ordinary rules of Prákrit), thus making **करितव्य** or **करतव्य** (the forms given by Pr. Prák. VII, 33.). Next these forms become contracted by sandhi to **करव्य**,† and finally one of the two **व**'s is elided (according to the Gaurian law explained in Essay II.), and the preceding short **अ** lengthened; thus we obtain the form

\* Bopp (Comp. Grammar § 875) adopts this opinion but with much hesitation.

† Cowell in his Pr. Grammar, p. 68, gives from one MS. the form **अहिय** or

If these are at all trustworthy, the analogous forms **करिय** or **करव** exhibit a form very nearly identical with the present Maráthī form **करावे** and altogether identical with the Braj Bháshá gerund **करिबौ**, on which more will be said further on.

कराव which is manifestly the base from which the Marāṭhī करावें is derived. Next take the alternative form करवीच. The nom. sing. neuter of it is करवीचं. Vararuchi's sūtra Pr. Prāk. I, 18 shows that Prākṛit has a tendency to shorten the vowel ई in such final syllables as ईच (= ईय or ईके), etc. The following examples are there given; Skr. पानीयं = Pr. पाणिचं; Skr. द्वितीयं = Pr. दुदुचं; Skr. तृतीयं = Pr. तदुचं; Skr. अलीकं = Pr. अलिचं, etc. We may well assume that in the vernacular Prākṛit these vulgar forms, of which only a very few were admitted into the literary Prākṛit, were much more general and regular; especially in the gerunds formed by the affix चणोय. Accordingly we may conclude that the nom. sing. neuter करवीचं became करविचं or (with insertion of euphonic च्) करविचं.\* Finally करविचं (or करविचं) becomes in Gaurian contracted to करवे. For ए is an extremely common substitute for any of the combinations इच, इय, ईय, या, यय, both in Prākṛit and Gaurian.† E. g. the syllable यय contained in all causal verbs becomes in Prakṛit ए, as कारेदि or कारेइ for Skr. कारयति, etc. Again the Skr. कियन् and इयन् become in Prākṛit केच् + इक् (properly कियन् + इक्) and एच् + इक् (= इयन् + इक्). Again in Gaurian (old Hindi) the Skr. Part. Past Act. affix इतवान्, which in Prākṛit becomes इचवन्नो or इचज्,‡ becomes एउ; as Skr. कथितवान्, Pr. कथिचवन्नो or कथिचज्, Hindi कहेउ (in old Hindi of Chand Bardāi कहेव). Again in low Hindi the Braj Bhāshā याकौ of him, याकौ to him, यासे in him, corresponds to the Ganwāri एकर, एको, एसे, etc. Again in Bangālī, in common conversation, a final or medial इया is contracted into ए (see Forbes' Bengali Gram. App. A. 4. p. 160. Shamachurn Sircar's Bengali Gram. p. 149, note 45.); e. g., धरिया becomes धरे, करनिया becomes करने. We shall meet with some more examples of this favorite contraction in the course of this Essay.§ Now the genitive of

\* An example of this form we have perhaps in the following verse of Chand;

कर सोहि पखव भानियं ॥

चज्जवान तो घरे जानियं ॥ Pr. Raj.

i. e. The cutting of the finger of my hand will be the destruction of thy house, oh Chahuvān. The same form we have probably in the Bangālī nouns of agency in चविषा (of. Shamachurn's Grammar, p. 149.); e. g., करनिया a doer = Naipālī करन्ना = Hindi करने का or करनेवाला.

† By analogy, ओ is a substitution for the combinations उय, उया, वा, यय as Braj Bhāshā याकौ = Ganwāri ओकर; Bangālī एउया in common conversation = एउो; cf. Skr. सुवर्षे = Pr. सुवो, Gaur. सोवा. But व is, as a rule, substituted by च, as चयते for वयते; and य by इ; e. g. in old and low Hindi he is both वय and इय.

‡ Of the change of the termination वान् into ज् in Prākṛit, I have found one example, in Mṛichhakatī Act IV. p. 119, कुहोदे रत्तिज विचयो = Skr. कुतश्चे रत्तावान् विचयः

§ Another example we have in Pāli and Prākṛit. In Pāli the affix of the Instr. Abl., Dat and Gen of feminine nouns is या (or य). The corresponding affix in

the Prākṛit base कर्णीच would be कर्णीचस्. This form कर्णीचस्, according to the process already explained, would successively change to कर्णीचास्—कर्णीचा or कर्णिचा—कर्णा which last form is identical with the *oblique form* of the Marāṭhī कर्णे.

Then as regards the low Hindi forms for the Marāṭhī कर्णे; viz., करने, करनू; the way how they are derived from the original Skr. कर्णीच or Prāk. कर्णीच is, probably, this. It does not seem probable that the sounds चो, चो, ऊ, are merely modifications of ए; at least I am not aware of any example of such a change of a terminal ए to चो or चो or ऊ. But we have seen on the previous page how the Prākṛit form कर्णीच would colloquially change into कर्णिच. Now there are many instances which prove that for the vowel इ of the polished Prākṛit the *vulgar* Prākṛit dialects substituted the *broader* अ; e. g., in Marāṭhī we have as the termination of the past part pass. the affix अल (as रुटला *got loose*) which stands for the Prākṛit इच or रत (see Pr. Prāk. VII, 32); above we had the vulgar form कर्णच for the more polished form कर्णिच. Thus it is probable that instead of कर्णिच the vulgar dialect pronounced कर्णच or, with the euphonic य, कर्णय. And finally कर्णय would become naturally contracted to करने, of which करने or कनू are merely dialectic variations. The first personal pronoun in the low Hindi of Braj है (Alwarī and High Hindi हूँ) affords a very good illustration of this change of the terminal च to है. Its equivalent in Sanskrit is अहम् which in Prākṛit becomes अ or अच (cf. Pr. Prāk. VII, 40.). Now the form अ could not have yielded the Gaurian form है; it could only have given ह, just as घर *house* gives हर, but not हरे. Hence the original of है must be the other form अच, and this violates no glottic law.\* It may, therefore, be accepted as a law that the

Prākṛit is ए; e. g., Pāli कन्याय *by, from, to, of a virgin*, but in Prākṛit कन्याए; Pāli नदिया, Prāk. नदरे; Pāli वधया = Prāk. वडहर. The Pāli is here nearer to the Skr., where these forms would be respectively (genitive) कन्यायाः, नद्याः, वध्याः. Similarly in the causal where the syllable अय is always contracted to ए in Prākṛit, but only optionally in Pāli; e. g., Skr. कारयति = Pāli कारयति or करेति = Prāk. कारेइ or कारेर. These and many other examples, especially the treatment of the medial consonants, prove that *phonetically* Pāli occupies an intermediate position between Sanskrit and Prākṛit.

See Dr. Mason's Pāli Grammar, p. 105 and p. 61. 37.

\* It should be observed also, that the Prākṛit form अच stands for an original form अक (i. e., base अ + affix क). This is proved by the Māgadhī Prākṛit form of ego अके or अने (cf. Pr. Prāk. ix, 9.) In Māgadhī, namely, the diphthong ए often stands in the place of the final syllable अ; e. g., in Mṛicohbhakatī:

अचं गुर मुक्तं ॥ i. e.  
Skr. अचं नवा मुक्तं ॥

sound **ब** may change to **वै**; and this conclusion is confirmed by the fact that the phonetic equivalent of **ब**, viz. **ब्रा**, also changes into **वै**; e. g., the first pers. sing. pres. of the verb *to be* is in the Braj **वै**, in Alwari **वै** (also high Hindi), in Jaipurī **वै**, in Naipali **वै** (in Bangali **বৈ**). The original of these forms is the Prākṛit **बह्मि** (see Prāk. Prak. XII, 19.), the substitute for the Sanskrit **बह्म** (from the root **बह्** for **बस**, just as **गह्** for **गम्**, **रह्** for **रत्**). The initial **ब** of **बह्मि** is dropped, (just as in **वै** or **वगे** for **बहम्** or **बहकम्**), and the final **इ** becomes *quiescent* (according to the Gaurian rule, see Essay III.) Thus we have **बाम** or **वा** (compare the Prākṛit future; e. g., **गमिस्सं** for **गमिष्यामि**). This is modified to **वै** or **वै**; next the aspirated palatal **ह** is reduced to the simple aspirate **ह**; and thus we obtain **वै** or **वै**. The *mode* of this change seems to be this, that the anuswāra, being the substitute of an original labial nasal **म्**, is vocalised into the labial vowel **उ**; at least this seems to be indicated by such Prākṛit nouns as **पाव** (= Skr. **पाद्**), **नाम**, **गाम**, (= Skr. **गाम**) which in the Gaurian becomes **पाव**, **नाव**, **गाव**, (Hindī), or **पाव**, **नाव**, **गाव**, (Naipali); both, in both Gaurian languages equally, are pronounced **वै**, **वै**, **वै**.

The Naipali equivalent of the Hindi forms **करवै** and **करवै** is **करवै**. It approaches most nearly to the Alwari form **करवै** and must be considered as merely a modification of it (a reduction of the terminal long **व** to short **उ**, so common in Gaurian). It has its exact counterpart in Gujarāṭi in the neuter nouns ending in **वानु** (see Edaljis Guj. Grammar p. 26, note 5.); as **उधरावु** collection. I think these neuter nouns in **उ**, both in Naipali and Gujarāṭi, ought correctly to be written with an anuswāra, as we have it in the Gujarāṭi infinitives in **वु**, as **करवु** *to do*. There are many examples of this change of a Hindi **वै**, **वै**, or **व** to **उ** both in Naipali and Gujarāṭi. There is, e. g., the Gujarāṭi infinitive, as **करवु**, (the exact equivalent of the Naipali **करवै**) which corresponds to the Braj Bhāshā infinitive **करवै** and the Alwari, **करवै** and Marwari **करवै**; again *sum* in the Braj Bhāshā is **वै**, high Hindi and Marwari **वै**, Alwari **वै**, but in Naipali and Gujarāt. **वै**; *quis* is in Hindi **कौन**, but in Naipali **कुन**, etc.

In order to remove all doubts as to the correctness of the identification of the ordinary Gaurian infinitives with the Sanskrit and Prākṛit participles future passive formed by the affix **वनीय**, I will add the following, as I think, conclusive arguments.

1. On the theory that the Gaurian infinitives are verbal nouns formed

Or. **रहे कक्षपि अपरादुपपन्नदुःखके मेरे** ॥ i. e.

Skr. **रतन् कक्षपि अपरादुपपन्नदुःखकं मेरेम्** ॥

Or. **काह न होर बहावले धरे** ॥ i. e.

Skr. **कक्ष न भवति बहावले धनम्** ॥

by the affix **ञञ**, the Gujarátí infinitive, which ends in **हुँ** (as **करहुँ** *to do*, **जाहुँ** *to go*) cannot be explained. Even if we should set aside the difficulty of deriving the termination **ई**, **वै**, **जै**, etc., from the Prákrit **ञ**, and should admit that, e. g., Maráthí **करचे**, Hindí **करनी**, etc., are derivable from the Prákrit **करञ**, still there remains the Gujarátí **करहुँ**, which, it is manifest, can in no wise be connected with the Prákrit **करञ**. On the other hand, on the theory that the Gaurian infinitives are identical with the (Skr. or) Prákrit part. fut. pass. the Gujarátí infinitives find a very easy explanation. The Gujarátí **करहुँ** *to do* or **जाहुँ** *to go*, etc., are evidently identical with the Maráthí **करावे** or **जावे**, i. e. the Gujarátí infinitives are identical with the Maráthí gerund in **जावे**. But the Maráthí gerunds in **जावे** are, as regards the sense, identical with the Maráthí forms in **चे** (e. g. **करावे** is identical with **करचे**). It follows that the Maráthí forms in **चे** and their equivalents in all the Gaurian languages must also be gerunds, i. e., derived from the Sanskrit, and Prákrit part. fut. pass. (or gerund, which is only a particular use of the former), formed by the affix **ञनीय**. On this theory everything falls easily and naturally into its place. Both Sanskrit participles fut. pass.,—those formed by the affix **ञनीय** as well as those formed by the affix **तञ**—passed through the Prákrit into Gaurian.\* In the latter they were among other uses put to the use of expressing the idea of the infinitive or gerund. But gradually one or the other of those alternative forms gained the ascendancy, and it so happened, that in all Gaurian languages, with the exception of Gujarátí, that participle future passive which was formed by the affix **ञनीय**, dispossessed the other formed by the affix **तञ**. On the contrary in Gujarátí the part. fut. pass. in **तञ** dispossessed the other in **ञनीय**. Still the *principle* of forming the infinitive is in all Gaurian languages identical. If this be the case, one may naturally expect that all or some Gaurian languages will retain traces of an original twofold form of the infinitive, derived from the twofold form of the Sanskrit and Prákrit part. fut. pass. Such traces actually exist, as I shall show, in the principal Gaurian languages. That both forms still exist and are commonly used in Maráthí has been already mentioned; e. g., *it is necessary for us to go abroad* is in Maráthí both **जन्नास देशाकरी जावया चे** and **जावया चे पड़ेज**; again *incitement to act* is either **करावया ची** or **करणा ची प्रेरणा** (see *Manual* §. III. note.). As regards Hindí, while the modern High Hindí possesses only the forms in **ना** (= **वै**), the old and low Hindí dialects possess both forms. In the Braj Bháshá the infinitive may end both in **वै** and **वै**, e. g., Rájanítí p. 69, **इसक बोली आई याने कहा जाववै** **चे**, i. e., high Hindí **इसक बोला**

\* I may take this opportunity of stating that, whenever this phrase of *Sansk. forms passing through Prákrit into Gaurian*, is employed, it is not meant to express a historic fact—for Prákrit is not a derivation of (what is commonly called) Sanskrit—but a phonetic fact.

भारं इस में क्या जानना है; or p. 24, तानें भिन्ना उपाय करि जीयों जोग मारीं छपन न मंगिबों बी भरिबों समान है (=high Hindi जीना योग्य नहीं है.....मंगना और भरना समान है). It may be remarked in confirmation of this view, that the declension of the infinitive in *नैं* is apparently defective; it occurs only in the nominative (in *नैं*) and locative (in *नि*); e. g., p. 4, बैठि रहनौ कपूत को काम है (= H. Hindi बैठ रहना); p. 6. वह विचार करि कहनि लाग्यो (H. H. कहने लगा). But in the other cases the oblique form in *वे* of the infinitive in *नैं* is substituted for the oblique form in *ने* of the infinitive in *नैं*; e. g., *तैं तुम ते कहु पूछवे को आया तैं* (= H. H. पूछने को); or *मेरे मन की बात काहू सों कहवे की मारीं* (= H. H. कहने की नहीं). In the Marwāri (form of the low Hindi), I believe, the infinitive in *वों*\* is even the only one in use; see the vocabulary appended to the "Selection of Khyāls or Marwāri plays" (Beawr Mission Press, 1866); e. g., *बुढवों to open* (खोलना); *ताकवों to leave* (त्यागना); *दिरावों to cause to give* (दिलाना); *निकसवों to quit* (निकसना), etc., etc.; examples are:

मैं हूँ बाणो रामगढ रो बंगरेज रो पायो ।

बहारो माह लूटवाबालो नहीं रजपूतो जाया ॥ e. g.

H. H. मैं हूँ बनिया रामगढ का बंगरेज की करिन्दा ।

हमारा माह लूटनेवाला राजपूत न होजायो ॥

Play Dangarasinha p. 4.

डकन दीया है कंपनी समैं बदल जमावा आया ॥

याँ कै कोई बॉटबुस जी येक लड़वा आये ॥

H. H. मैं बदल जमाने को आया हूँ तुम कौ लड़ने को आयेगे ॥

Play, Angrez our Pathān p. 73, 75.

As regards Panjābi, I am inclined to think that what the Lúdiānā Grammar calls the indefinite participle and which is not declinable, is, in reality, that other form of the infinitive. It terminates in *वे* which is identical with the *oblique form* of the Braj Bhāshā infinitive in *वैं*.—As regards Bangālī, it possesses both forms of the infinitive, *viz.* in *न* and in *रवा*; as *करन* and *करिवा to do*. The latter form in *रवा* is to be compared with the Braj Bhāshā *oblique form* in *रवे* of the infinitives in *रवई*;

\* I write the Marwāri Infinitive (in *वों*) as well as the Braj Bhāshā infinitive (in *वैं*) with a final Anunāsika. The printed books that I have seen, never have it. The reason is that by the vulgar a final nasal is often very indistinctly pronounced, sometimes even altogether dropped; e. g., the local particle *ने*\* is in Ganwāri and other low Hindi dialects commonly pronounced only *ने* or *न*. Nevertheless there is no doubt whatever, that the correct form is *ने*\* or *नै*. For the same reason the form with the final Anunāsika is the correct form of those infinitives; for only the Nom. sing. neuter of the part. fut. pass. is capable of expressing the infinitive idea, that is, the mere act of the verb, see the sūtra of Pānini quoted below; e. g., *करिबों* can only be a corruption of *कर्त्तव्यं* but not of *कर्त्तव्य*, as in Latin *agendum* may stand for *agere* but not *agendus*.



as Bang. करिषा = Braj करिषे or करवे. They are identical; for, as I shall show afterwards, the Bangálí infinitive in इषा is merely the *oblique form* (= Prakrit genitive sing.) of an infinitive in इषी; it never occurs in the nominative (*i. e. direct form*); see Shama Churn Sircar's Grammar p. 149, note 40. The Bangálí infinitive in इषा is also almost identical with the Prakrit form of the part. fut. pass. in तव, as given in some MSS. which have, e. g., वसिष्य for वसिष्यन् the usual form. The form वसिष्य is, no doubt, the form of the later Prakrit, arisen from the older form वसिष्यन् by sandhi (or phonetic decay). The real origin of the infinitive (or gerund) in न has become very much obscured in modern Bangálí; though there are a few indications of it still remaining; e. g., while the final short ञ् of the infinitive of the Ist and IIInd classes of verbs is *quiescent*, that of the infinitive of the second class and the causal verbs is pronounced (as ö). Again while the infinitives of the former classes are declined according to the first declension, *i. e.*, like such nouns as बाघ tiger, बालान् child (with *quiescent* ञ्; the infinitives of the IIInd class are declined according to the IIIrd declension, *i. e.*, like such adjectives as बर great, छोट small (with audible ञ्), see Shama Churn Sircar's Grammar, pp. 129, 149, note 40. For example करण् to do (Ist class) is pronounced karan, but वेड़ान् to walk (IIInd class) is pronounced berāñö. Again, the genitive of करण् is करणेर, but that of वेड़ान् is वेड़ानर. I have shown already (in Essay III) that the Bangálí nouns ending in an audible ञ्, belong to the *Prākritic element*, that is, that their final audible ञ् is a contraction of the original Prakrit ending ञक (रञ् or ञञ्. रञ्). Accordingly, the final audible ञ् of the infinitive also indicates that it must be the remnant of an original Prakrit ending रञ् or रञ् (that is, that ञन and ञ stands for ञरीञ् or ञरिञ्). Another indication of that real origin of the infinitive or gerund in न is this, that they may optionally end in नि, instead of न; e. g., *threading* may be both गौंछन and गौंछनि (Ist class); *burning* पोड़ान and पोड़ानि (IIInd class), *thatching* छाडन and छाडनि (IIIrd class), see Shama Churn Sircar's Grammar, p. 186. Now this form in नि is also found in the Braj Bhāshā, where it is a substitute for the form in ने or वे (*i. e.*, the *oblique form* of the infinitives in नीँ and वेँ); e. g., he began to speak is in the Br. Bh. कहनि लग्या for the high Hindí कहने लगा. The termination ञनि is, evidently, in both languages alike, a corruption of the Prakrit termination ञरीञ्; and as it is found in the infinitives of all three classes of Bangálí verbs, it indicates that the infinitives of all three classes are really the Prakrit Part. Fut. Pass. in ञरीञ् (Skr. ञरीञ्). Moreover these forms of the infinitive in र् (as कहनि), and the Naipálí infinitive form in ञ् (as लनञ्) clearly show, how gradually the original ending ञरीञ् has become worn down to a simple ञ्; for the final short र् and ञ् become according to the Gaurian law *quiescent* and thus like ञ (see the explanation of this process

in Essay III) ; e. g., instead of the Braj Bhāshā कबन जागो we have in Naipālī भवन जाग, in Sindhī बवन जागे. In this respect Sindhī agrees with Bangālī ; in both languages the termination of the original affix वनीय has become worn off altogether. Sindhī infinitives, e. g., are पढ्न *to read*, जाग्न *to wake*, करन *to do* (see W. H. Wathen's Sindhī Grammar, pp. 37, 38). But it is clear that in modern Bangālī, in consequence of the affix वनीय having become decayed to वन and the real origin of the latter being forgotten, a great confusion has arisen. For in many cases, Sanskrit verbal nouns, really formed by the affix वन (not वनीय), have been introduced into Bangālī to serve as infinitives, under the mistaken idea that the Bangālī infinitives in वन, are really such verbal nouns. A notable instance of this kind is the so-called infinitive करव *to do*. This word करव is really the Skr. verbal noun करवन्. This is shown by the presence of the lingual व. It is not a corruption of the Skr. कारवीयन् ; for in that case it would be written करन (as it is in Sindhī), as Bangālī, like Hindī, turns all lingual व which it has received through the Prākṛit, into dental न. This is proved by the causal करान (for Prākṛit कारावनीय, for Skr. कारवीय), which ends in the audible व (karānū), and therefore has retained more of its original character. I believe, therefore, that the real infinitive of the (primary) verb *to do* is करन, and not करव, which latter form is probably merely an emendation of Bangālī purists, prompted by a mistaken etymology, (as if it were a Sanskritic word, and identical with the Skr. करवन्). Perhaps old Bangālī MSS. (of which I have no specimen) might bear out my view. As regards Gujarātī, there also both forms of the Skr. and Prāk. Part. Fut. Pass. occur. That in लव we have represented by the ordinary Gujarātī infinitives in लु. The other in वनीय, I think, we can trace in the Gujarātī verbal nouns in वावु, as उषरावु collection (see Edalji's Grammar, p. 26, note 5).

2. Another argument for the identity of the Gaurian infinitive and the Sanskrit and Prākṛit Part. Fut. Pass. in वनीय is this, that in Hindī and Panjābī the infinitives are often used as adjectives and admit of a differentiation of gender and number ; e. g., in High Hindī and Panjābī करना is masculine and neuter, and करनी is feminine : in the Braj Bhāshā it is करनौ masculine, करनी feminine, and करनौ neuter. Thus, "to make many excuses is not good," is in Hindī बहुत बाने बनानी (feminine plural) बाना नहीं ; "there will be gnashing of teeth" is in Panjābī कबीलीया केरीया खोखनीया (lit. to take gnashings of teeth will be) ; see Etherington's Hindī Grammar, §. 541, and Loodiana Gram. of Panjābī §. 156. Now the Sanskrit and Prākṛit nouns in वन do not admit a change of gender and number in relation to another noun, because they have no adjectival force, but are merely substantives ; whereas the Part. Fut. Pass. in वनीय are adjectival and change in gender and number. It does not seem probable, nor even

possible, that the verbal nouns in **चन** can have changed their character so radically in Gaurian.

3. It is a very peculiar usage of all Gaurian languages to employ the infinitive to express *command* or *necessity*. E. g., "never go to their house" is in Hindi **उन के घरों कभी न जाना** (Braj Bhāshā **जानों** or **जावें**), which would be in Sanskrit **अनूषां स्थानं कदाचिद् न गानीयन्**. Again "we must all die" is **हम सबों को मरना है** = Skr. **अस्माकं सर्वेषां (हते) मरणीयमस्ति**. In Panjābī **तुमीं आउना** "you must come" = Skr. **युष्मानिद् आगमनीयम्**. In Marāṭhī **परलिखित जावें** "continue to write to us." (See Etherington H. Gr. §. 544, 545. Loodiana P. Gr. §. 95. \*Manual of Mar. Gr. §. 110, note). The only rational explanation of this usage is afforded by the theory of the identity of the Gaurian infinitive with the Sanskrit and Prakrit Part. Fut. Pass. It may be also noted that in modern Sanskrit, the proper imperative is almost as a rule substituted by the Part. Fut. Pass. (in **चनीय** or **तब**).

4. All the uses to which the Sanskrit Part. Fut. Pass. in **चनीय** is put according to this theory in Gaurian, (e. g., to express the mere act, as infinitive), is provided for by Pānini. He has a sūtra **ल्यबुटो षडलम्** (III, 3, 113), which is explained in the *Laghu Kaumudī* to mean, that the Kṛitya affixes, to which **चनीय** and **तब** belong, are occasionally employed in many ways different from that enjoined by the ordinary rules (see *Siddhānta Kaum.* p. 300, 2nd Vol. and *Laghu Kaum.* No. 823, p. 284). The examples given are **स्नानीयं घूर्णं** powder for bathing (to both) = Hindi **गहाने का घूर्ण**; and **हानीयो विप्रः** a brahman who is to be presented (with something); with which compare in Panjābī **मैं उधे विचिहा ऊच हों** = Hindi **मैं वहाँ बैठने का हूँ**; or **ऊच होरना गहो दी बाबत् लिखवा हों** = Hindi **मैं (or हों) दूसरी बातों की विषय लिखने का हूँ** (see *Loodiana Grammar*, §. 95). These irregular, *bahulam* uses, of the Part. Fut. Pass. were, no doubt, more peculiar to the *vulgar* Sanskrit; and, hence, it is intelligible, how they became the regular uses in the Gaurian. Note also the commentary to the sūtra **तब्यनानीयरः** (Pānini III, 196), where the example is given **रहितत्वं रचनीयं जया** and this is explained **भावे औत्सर्गिकम् एकवचनं स्त्रीत्वं च** (*Siddh. Kaum.* p. 298, 2nd Vol.), i. e., when the Part. Fut. Pass. expresses the *action itself* (= *रचनम्*), the *singular and neuter* is *naturally* employed. Accordingly, the Part. Fut. Pass. (in **चनीय** and **तब**) in the sing. neuter may express the mere act of the verb. Both characteristics are found in the Gaurian (so called) infinitives. They, *quā infinitives*, both express the mere act of the verb, and also stand in the sing. neuter; as Hindi — **गों** or **(ना)**, Marāṭhī — **ने**, Gujarātī **हुँ**, etc.

5. Perhaps the most serious objection which is felt at first sight against the identity of the Gaurian infinitive with the Sanskrit and Prakrit Part. Fut. Pass. is this, that it involves a change from the Pass. and Future to the Active and Present. But we have an exactly analogous phenomenon

in Latin. The Latin Part. Fut. Pass. in *andus* or *endus* may also have a passive or an active sense. When it is used passively, it may either imply futurity, in which case it is the proper Part. Fut. Pass., expressing chiefly necessity or fitness; or it may imply present time, in which case it is a verbal adjective (commonly called gerundive), expressing an enduring contemporaneous action. When it is used actively, it serves to express the oblique case of the Infinitive Present Active, and is called the Gerund. Now exactly in these three ways the Sanskrit and Prākṛit Part. Fut. Pass. is used in Gaurian; e. g., in gerundial construction, *there is time to write a letter*, is in Latin *epistolam scribendi tempus est*, in Gaurian *लिखने का काल है*; or in gerundival construction, Latin, *tempus est epistolae scribendae*, Gaurian *लिखनी लिखनी का काल है*; or in Part. Fut. Pass. construction, *you must write a letter*, Latin, *a vobis epistola scribenda est*, *तुम से लिखनी लिखनी है* (or *लिखनी चाहिये*). The Gaurian goes a step beyond the classic Latin in using the Part. Fut. Pass. also to express the nominative case of the infinitive; but the same usage is not unknown to the Latin of the middle ages, where the Nom. Sing. Neut. is sometimes used to express the mere act of the verb as *scribendum* to write = Hindī *लिखनी* (H. H. *लिखना*).<sup>\*</sup> The Latin has another parallel case in the verbal adjectives in *tivus*, which have generally active sense, but as regards origin are identical with the Sanskrit Part. Fut. Pass. in *तव्य* (e. g., *activus*, *dativus* = *दानवः*, etc.), see Bopp's Comp. Gram. §. 902, p. 352, IIIrd Vol. Also the Pāli has an analogous usage. It employs sometimes the Sansk. Part. Fut. Pass., formed by means of the affix *य*, to express the mere action of the verb, e. g., *देय्य giving* = Skr. *देय* (of root *दृ*), *पेय्य drinking* = Skr. *पेय* (of root *पृ*), *रेय्य rejecting* (of *हृ*); *जेय्य loving* (of *जृ*), *ज्ञेय्य knowing* (of *ज्ञृ*); see Mason's Pāli Grammar, §. 263a, p. 146, also §. 235b, p. 134.

But we must return to our original enquiry. We have now seen that the Gaurian neuter terminations *ई*, *औ*, *औ*, *ऊ*, etc., cannot be derived from the Sanskrit neuter termination *ञस्* or the Prāk. neuter termination *च* or *च*. We have further, by an examination of the Gaurian infinitive and gerund, seen, that their neuter terminations *औ*, *ई*, *ऊ*, etc., are derived or contracted from the Sanskrit termination *इयञ्* and the Prākṛit termination *इयं* (or *इयं* or *इयं*). This not only confirms the law of derivation stated previously (pp. 65, 66.), but also discovers the *modus* of the derivation of the Gaurian neuter terminations *ई*, *औ*, *ऊ*, etc., viz., that they represent a Sanskrit or Prākṛit terminal *dissyllable* (in the present case *इयं* or *इयं*).

<sup>\*</sup> If Bopp's opinion (Comp. Gram. §. 809, p. 183, IIIrd Vol.) be correct, as it doubtless is, that the Latin Part. Fut. Pass. in *andus* is originally identical with the Prāk. Part. Pres. Act. in *अन्* or *अन्* (Skr. in *अन्*), the process of change in meaning is in Latin exactly the reverse from that in Gaurian. But this does not affect the argument in the text, as the principle of change is identical in both cases.

I will now proceed to illustrate this theory by the examination of a few other neuter forms in Gaurian which will lead us to the same result. In Maráthi there are three irregular past participles of an identical formation, quite peculiar to these three only. They are गेले (of root गन् to go), केले (of root कृ or कर to do), and मेले (of root मृ or मर to die). I have given them in the form of the Nom. Sing. Neuter. Their corresponding masculine would be गेला or गेला, केला or केला, मेला or मेला.\* These three past participles are also irregular in Mágadhi Prákrit; and their irregularity is also quite peculiar to themselves. The corresponding (Mágadhi) Prákrit forms are, namely, गडे, कडे, मडे, (see Pr. Prak. XI, 15). These forms are in the nominative singular masculine; the final ए being the Mágadhi substitute for the common Prákrit termination यो (Pr. Prak. XI, 10.). Their corresponding neuter would be गडं, कडं, मडं. These represent the Sanskrit forms गतं, कृतं, मृतं. Here the Sanskrit dental त् of the past participle affix त् has become in (Mágadhi) Prákrit lingual ड; and this in Maráthi-Gaurian has changed to ल. This change of Skr. त् and Prákrit ड to ल, however, is in Maráthi not confined to the three past participles गेले, केले, मेले, but has become universal, as got loose is हुडले, etc.; and therefore it is not the irregularity peculiar to these three participles. The peculiar irregularity of those three participles is in Prákrit, indeed, their change of the Skr. त् to ड; but in Maráthi the peculiar irregularity is not the change of ड to ल, but of the first क् to ए; compare Mágadhi Prákrit गडं, कडं, मडं, with Maráthi-Gaurian गेले, केले, मेले. But this peculiar Maráthi change of क् to ए is also explained by the Prákrit; for, fortunately, in regard to one of the three (*viz.*, केले) the change shows itself already in Prákrit. Here, namely, we meet with the past participle form केलिकं or केलकं for Sanskrit कृतम्. For केलिकं we find also केरिकं or केरकं. They are derived from the original past participial form कृतं or कृतं or करं. To this the peculiar Prákrit affix क is added (hence करक or कलक); then the first क् is changed to ए by the rule of Pr. Prak. I, 5. (hence केरक or केलक); then the termination कक is weakened to क (hence केरिक and केलिक). We have now traced the origin of the Maráthi form केले in its various steps. They are; 1., Skr. कृतं, 2., Mág. Prák कृतं or कलं, 3., Prák. कलकं; 4., Pr. केरकं; 5., Pr. केलिकं or केलिकं, 6., Mar. Gaur. (old) केलिकं, 7., Mar. केले. That is, the terminal र of the Maráthi form केले is not derived from the terminal र of the Prákrit form कलं, but from the *terminal dissyllable* इकं or इकं of the Prákrit form केलिकं or केलिकं. In other words, we have arrived at exactly the same result as that of the previous examination of the infinitives. But to this another result must now be added; *viz.*, that the

\* The masc. forms in *ये* here and wherever else mentioned in these essays, are old Maráthi.

terminal dissyllable **इयं**, to which nothing corresponding exists in Sanskrit, is owing to the addition of the Prākṛit affix **क**.

Now by an exactly analogous process we may derive from the Māgadhi Prākṛit forms **मइ** and **मइ**, first the intermediate Prākṛit forms **मेइल** and **मेइल**; and next, the Marāṭhi forms **मेले** and **मेले**. The identity of the process of their origin is guaranteed by the identity of their peculiar irregularities.

But further, the neuter termination **ले** is not only found in those three past participles (**मेले**, **केले**, **मेले**), but in *all* Marāṭhi past participles. It follows therefore, that their formation must be analogous to that of the other three participles; that is, that their termination **ले** cannot be derived from the Sanskrit or Prākṛit termination **त्**, but from a Prākṛit termination **न** or **न**; in other words, from the base of the ordinary Prākṛit past participles, increased by the peculiar Prākṛit affix **क**; \* c. g., Mar. **मारिले** *killed* is not derived from Prākṛit **मारितं** or **मारिषं**, but from the amplified Prākṛit form **मारितन** = **मारिडन** = **मारिडन** = **मारिले** or **मारितन** = **मारिषन** = **मारिषन** = **मारिले**.

But that is not all. The result of the present enquiry must plainly be put into the form of a much more general law; *viz.*, whenever a Prākṛit (or Sanskrit) neuter noun, be it a participle or a substantive or an adjective, has a terminable monosyllable **अ**, but shows the termination **इ** in its stead in Marāṭhi; this Marāṭhi termination **इ** cannot be derived from the Prākṛit terminal monosyllable **अ**, but must be derived from a Prākṛit terminal dissyllable **अयं** or **इयं** (for **अकं** or **इकं**), obtained by adding the Prākṛit affix **क** to the Prākṛit base in **अ**. No other Prākṛit affix can here come in consideration (for effecting that increase of the base); 1., because no other affix beside **क** is added *without affecting the meaning*; and 2., because, though in a few cases one or two other affixes are added without any meaning, (e. g., Skr. **विद्युत्** lightning is in Prāk. **विद्यु** or **विद्युली**; Skr. **पीत** yellow is in Prāk. **पीयं** or **पीयलं**, see Pr. Prāk. IV, 26), such addition of these affixes is confined to these isolated cases, while the addition of **क** is *most common* and may be made to *any* noun (Pr. Prāk. IV, 25); and 3., moreover in order to account for the Gaurian terminal forms **इ**, **औ**, etc., the elision of the consonant of the affix is necessary; now **क** can be elided, but **अ** is not elided.

The results which have been set forth so far, might have been equally well arrived at by taking the case of a Hindi past participle. E. g., **है** is

\* It is noteworthy that in the Gāthā dialect (or vulgar Sanskrit) "nouns and participles are frequently lengthened by the addition of the syllable **क**, as **रोहन्का**, **मन्त्रानका**, **भावमानका**, **इदिका**, **रोहितका**, **आगतिका**, **दासिका**." (Muir, *Sanskrit Texts*, vol. II, p. 123). Mark, how often the terminal syllable **अक** changes to **इक**.

said is in the Braj Bhāshā कयोँ. This is the nom. sing. neuter; the masc. would be कयो, the fem. कयी. The corresponding form to कयोँ is in Sanskrit कथितं and in Prākṛit कथिद् or कथिचं. Now the form कथिचं could not yield the Hindi form कयोँ, because the vowel इ of the Prākṛit form is present in the semivowel य of the Hindi form and the remaining terminal चं cannot give योँ, according to general glottic law. But if we add the favourite Prākṛit affix क to कथितं, everything is natural and easy. For कथितकं would be in Prākṛit कथिचकं, and this in Hindi-Gaurian कथिचोँ or कयोँ (just as वचं ego becomes योँ).

According to this theory, then, the original of the Gaurian neuter terminations ऐँ, ईँ, ओँ, ञाँ, ऊँ, औँ, is the Prākṛit terminal dissyllable रचं or अचं, which, according to Gaurian law,\* becomes in old Gaurian रयं or अयं or अचं. If this be really the case, it might not unreasonably be expected, that traces of those original terminal forms रचं, अचं, अचं may be found in Gaurian. Such examples I am, indeed, able to produce; and they will be a further confirmation of the truth of my theory. Only this is to be observed. The Gaurian terminal forms रयं, अयं, अचं, are very slightly, if at all really, different from the Prākṛit terminal form रैचं (for Skr. रैचं), रयं (for Skr. रयं) and अचं (for Skr. अचं). If, therefore, the Gaurian forms at all existed, they can only have existed in the earliest period of the Gaurian, when it was yet only a modified and decayed form of Prākṛit. In Hindi we have no literature dating so far back. The earliest Hindi work known at present is the epic of Chand, which is already subsequent to that period; how much subsequent, it is not easy to say; but it is in Chand, that we find traces of those original Gaurian neuter terminations; only, for the reason now explained, they must not be expected to be very common.† Such examples are the following:

\* This Gaurian law has been repeatedly referred to in these essays, though I have never distinctly stated it. It is this; Gaurian cannot tolerate the hiatus of vowels created by the Prākṛit, through ejecting the medial single mute consonants of the Sanskrit; and in order to prevent such hiatus, Gaurian either makes Sandhi of the vowels or separates them by inserting the (euphonious) semivowels य, or व. It should be noted, in order to prevent misunderstanding, that Gaurian sometimes creates hiatus of its own; these, of course, it retains. The law has only reference to hiatus, created by Prākṛit, e. g., Skr. उद्यविष्टः becomes in Prāk. उद्यरुष्टो; in Gaur. उद्यो (Hindī); Skr. चर्मकारः, in Prāk. चर्मचारो, in Gaur. चमार; Skr. करवधारकः, in Prāk. करवधारके or करवधारो, in Gaur. (Mar.) करवारो or (Hindī) करवधारा; Skr. लोचनं, Pr. लोचचं, Gaur. लोचनं; Skr. जनः, Pr. जयो, Gaur. जया; Skr. जनः, Pr. जिजो, Gaur. जिजा, etc.

† On account of Marāṭhī being so much more conservative of its Prākṛitic character, I should expect old Marāṭhī to afford many more examples of those Gaurian neuter terminations; but unfortunately I have had no opportunity of examining any old Marāṭhī work.

बोले वचन बली तामयं ।

चञ्जवां बलि अज्ञानयं ॥ I, 26.

Or वनननिनयककसेन । कश्चित् न च पूर्वयं ॥

चतुस्रं च छतं रणा । विना खानी रिन जुधं ॥ IV, 220. 230.

or कुट्टे सिरं करारयं ।

कपास यौ पिंजारयं ॥

परीय संग सामयं ।

च लुक्क रवि नामयं ॥ IV, 204. 207.

फटिय वत प्रहासं । अनिलं सिजेन परिसलयं ॥ IV, 278.

An instance of the neuter in द्यं occurs, e. g., in the following verse :

कर मोहि पञ्चव भानियं ।

चञ्जवान तो घरे हानियं ॥ I, 26.

In the last verse भानियं and हानियं are probably contractions of भननियं and हननियं for Skr. भञ्जनीयं and हननीयं in the sense of the infinitive. In the former verses अज्ञानयं stands for अज्ञानं; पूर्वयं for पूर्वं, करारयं for करारं, पिंजारयं for पिंजारं; सामयं for सामं; नामयं for नाम. And the only, and natural, way of explaining the origin of these amplified forms is by the theory that the shorter forms were increased by the addition of the Prākṛit affix क्; thus we should have (with the usual elision of क्) the Prākṛit forms अज्ञानक्, पुञ्चक्, करारक्, पिंजारक्, सामक्, नामक् and finally these forms would change in Gaurian by the usual insertion of the euphonic च into अज्ञानयं, पूर्वयं, etc.\*

Such neuters as अज्ञानयं, पूर्वयं, etc., prove clearly that general principle which has been stated already, that the Prākṛit affix क् was not only added to participles past passive, but also to substantives and adjectives; though this is a fact, which perhaps hardly needed to be particularly stated. But these neuters account very well for the Marāṭhī neuter adjectives and substantives in रैं as उबे<sup>१</sup> *high*, तळे<sup>२</sup> *tank*, etc. For the termination अयं as previously shown naturally contracts into रैं.† Hence, e. g., उबे<sup>३</sup> presupposes an older form उबयं, which stands for उबक् just as अज्ञानयं for अज्ञानक्.

We have now seen that the Prākṛit neuter nouns (Part., Adj., Subst.) may pass into the Gaurian either in the *general* form of their base ending

\* I may add here, once more, in explanation, that it is not to be supposed that every Gaurian neuter actually passed through these different steps of phonetic modification. The process of neuter formation, detailed here, only took place really when Gaurian first separated from Prākṛit. After it had become the rule in Gaurian, that neuters must end in अयं or रैं or यौ, many neuters, of course, were formed which never passed through any of the steps of the process; e. g. the neuter पूर्वयं is formed direct from the Sanskrit पूर्वं. If it had passed *really* (as *ideally* it must be supposed to have passed) through that process, it would have been either पूवयं; or पुवयं; for the Prākṛit of पूर्वं is पुवक्.

† In Col. Vans Kennedy's Marāṭhī Dictionary the form से<sup>४</sup> is given for अयं fear.



in **ञं**, in which case these neuters terminate in Gaurian in **ञ**; or in the *particular* forms of their base ending in **ञञं** (amplified by the addition of the affix **क**). This termination **ञञं** becomes in old Gaurian **ञञं**. Instances of old Gaurian neuters in **ञञं** have been adduced. In modern Gaurian the termination **ञञं** is contracted to **ञं**; and this neuter terminal form we have in Marāṭhī.\*

But the old Gaurian termination **ञञं** is not the only form which the Prākṛit termination **ञञं** (= **ञकं**) assumes in Gaurian. The Prākṛit termination **ञकं** (or **ञञं**) suffers in Prakrit already a twofold deteriorating process. It changes sometimes into **इकं** (or **इञं**), sometimes into **उकं** (or **उञं**). This deterioration is found in Prākṛit only in a few and isolated cases; but in Gaurian it has assumed much greater dimensions, and has affected, as we shall presently see, whole classes of nouns. It is therefore doubtlessly more appropriate to consider these phonetic modifications of the original Prākṛit termination **ञञं** as a Gaurian one, than as a Prākṛit one. This should be noted, as it has some bearing on the question of the presence or absence of an *oblique form* of the Gaurian nouns which have this modified terminal form. For proofs of the deterioration of the Prākṛit base-termination **ञक** into **इक** and **उक**, I must refer more especially to the examination of the Gaurian masculine and feminine nouns in **ई** and **ऊ**. In the Mṛichchhakati the form **केरक** (the Prāk. modification of the Sanskrit **कृत्**) often alternates with **करिक**. Again, the Sanskrit **हृषिक** *scorpion*, itself already modified from an original form **हृषक**, becomes in Prākṛit **विंशुक** or **विंशुच** or **विंशुच** (cf. Pr. Prāk. I, 15).\* Again, the Sanskrit **मादक** becomes in Prākṛit **माउच** (for **मातुक** cf. Prāk. Prāk. I, 29); that is **मादक** first changes to **मातक**, (by Pr. Prāk. I, 27; next to **मातुक**). If the Prākṛit base termination in **ञक** may change to **इक** or **उक** in the case of masc. and fem., it is plain that it may do so also in the case of neuters. In Gaurian the Prākṛit neuter terminations **इञं** (= **इकं**) and **उञं** (= **उकं**) are slightly modified; viz., in old Gaurian to **इं** and **उं**, and in modern Gaurian to **ईं** and **ऊं**, e. g., *pearl* is in Skr. **मुक्ता** in Prāk. **मोक्ता** or **मोत्तिका**. The latter has a bye-form **मोत्तिकां** or **मोत्तिकां** (Skr. **मोत्तिकां**), and this changes in old Gaurian to **मोत्तिकां**, in modern Gaurian (Marāṭhī) to **मोतीं**. That this is the true derivation of the final of **मोतीं** is proved by such neuter nouns as **पाणीं** *water*, **मोरीं** *pepper*, **मोरीं** *butter*, **दहीं** *curds*. For **पाणीं** represents an old form **पाणिञं**, a Prākṛit form **पाणिञं**, and Skr. **पाणीयम्**; **मोरीं** represents an old Gaurian **मोरिञं**, a Prākṛit **मोरिञं**, and Skr. **मोरिचम्**; **मोरीं** an old Gaurian **मोहिञं**, Prāk. **मोहिञं** or **मोहिञं**, and a Sanskrit **मवचीतम्**; **दहीं** an old

\* But the unmodified form **विंशिक** or **विंशिक** must have existed also in Prākṛit. This is proved by the Naipālī which has **विंशिक** for *scorpion*, (see St. Luke xi. 12, x. 19.), while the Hindi has **विंशू** and the Marāṭhī **विंशू**.

Gaurian दक्षिणं, a Prāk. दक्षिणं or दक्षिकं, and Sanskrit दक्षि. Again *touch* is in Sanskrit स्पर्श, in Prākṛit फंस or फंसक; the latter has a bye-form फंसुक्क or फंसुक्कं, (with the meaning *branch* of a river) which changes in old Gaurian to फंसुवं and in modern Gaurian (Marāṭhī) to फेंदें. This derivation is proved by such neuter nouns as फेंदें *tear* which stands for a Prākṛit फंसुक्क or फंसुक्कं and a Sanskrit अश्रु; and जू *yoke* which stands for Prākṛit जुक्क and Sanskrit जुगम्.\*

We have now discovered the derivation of all the Gaurian neuter terminal forms; viz.

Mar. रें is derived from old Gaur. अवं and Prāk. अवं (= अकं)

" रें " " " " " दवं " " दवं (= दकं) or रेंदें (= रकं)

" जें either " " " उवं " " उवं (= उकं)

or " " " अव or ओ " " अवं (= अकं)

Hiudi } रें } is derived " " अव or ओ " " दवं (= दकं)  
          } रें }  
          } जें }

Gujar. } रें }  
Naipālī } उं " " " " " अव or ओ " " अवं (= अकं)

The neuter terminal forms, of which the derivations are here given, are the terminations of the *direct forms* of the Gaurian neuter nouns. We will now proceed to examine the *oblique forms* of the same nouns. And it will be seen that this examination under the result already attained.

We will first take the Marāṭhī neuter nouns in रें. These are divided into *three* classes; (1) those which have no *oblique form* at all, as राजाळू a kind of vegetable; (2) those which have an *oblique form* in वा, (i. e., substitute वा for रें), as तडू *pony*, *oblique form* तडा; (3) those which have an *oblique form* in वा, (i. e., substitute वा for रें), as ताळें *ship*, *oblique form* तावा (or तारवा). Now if we turn back to the list of derivations of the *direct forms* given above, we find a twofold derivation of the *direct form* in रें, and it will be easily seen, that there is a close agreement between the twofold derivation of the *direct form*, and the three-fold formation of the

\* Some other neuters of this kind are the following; ताळें *ship* for Prākṛit तारवं bye-form of तारवं and Sanskrit तारकम् a raft, float; गळू *bile* for Prākṛit गळुक्कं, bye-form of गळुक्कं (= गळकं), amplified from Sanskrit गलः; पेंदें *bile* for Prāk. पेंदें, bye-form of पेंदें, and Sanskrit पिटकम्. Again कुळें *circumvallation* for Prāk. कुळें and Skr. कुण्डलम्; कुंजें *powder* for Prāk. कंजुक्कं and Sanskrit कंजुक्कम्; चकं *handle* for Prāk. चरवं (= चरकं), amplified from Sanskrit चक्र. The change of the Skr. comp. cons. लु into ल is noticeable and exceptional; the regular change is into ल (see Pr. Pr. III, 40.), ल being the regular representative of ल (see Pr. Pr. III, 12). Note also that the Hindi equivalent of the Mar. जू *yoke* is जुवा or जु, the former of which would represent a Prāk. form जुवक्कं for (जुगकं). The form जुवक्क occurs in the old Hindi of Chand; e. g. in the verse.

जगमे तर्वा जुवक्क ह नयवं ॥ Devagiri Kathā v. 22.

*oblique form.* Namely (1), neuter nouns in **अँ** which have an *oblique form* in **आ**, are derived from a Prākṛit *base* in **अअ** (= **अक**) ; and (2) neuter nouns in **अँ** which have an *oblique form* in **बा**, are derived from a Prākṛit *base* in **उअ** (= **उक**) ; and (3) neuter nouns in **अँ** which have no *oblique form* at all, are derived or rather modified from Prākṛit neuter nouns in **उअ** (= **उक**). Examples will explain this further. A neuter of the first class is **पिअँ** *cub* ; in Sanskrit the word is **पितृ** : masculine, but the neuter (in diminutive or endearing sense) would be **पितृ**. The latter, in Prākṛit, is **पितृ** or **पितृक** or **पितृअ**. Again, the last of these **पितृअ**, changes in Gaurian to **पितृ** and this to **पितृ**. The latter is the present Marāṭhī *direct form* of the word. Now the genitive of the Prākṛit **पितृअ** is **पितृअसु** or **पितृआस** or **पितृआह**. The last of these becomes in Gaurian **पितृआ** or (contracted by Gaurian law) **पितृ**, which is the present Marāṭhī *oblique form* of the word. Again, **पेलूँ** *boil* is a neuter of the second class. The Sanskrit is **पिडः** : masc. or **पिडक** : neuter. In Prākṛit the latter becomes **पेडअ**, which must have had a (probably vulgar) bye-form **पेडअ** ; and this form **पेडअ** changes in Gaurian to **पेलुअ** (or perhaps **पेलुअ**), and this to **पेलूँ**,\* and this to **पेलूँ**, which last is the present Marāṭhī form of the word. Now the genitive of the Prākṛit **पेडअ** is **पेडअसु** or **पेडआस** or **पेडआह**. The last of these forms becomes in Gaurian **पेलुआ** or (contracted by Gaurian law) **पेलुआ**, which is the present Marāṭhī *oblique form* of the word. Dadoba in his Marāṭhī Grammar admits only this form ; but the *Manual* apparently admits also a form **पेलुआ**. If this be correct, the *oblique form* in **अआ**, doubtlessly, is merely a euphonic modification of the original *oblique form* in **आ**, in order to obviate the difficulty of pronouncing a double consonant.† Again **चाँचूँ** is a neuter of the *third* class. I know no Sanskrit or Prākṛit etymology for this or most of the neuters of this class, though, no doubt, some of them may have such an etymology. But they all have been evidently so much phonetically modified by the Gaurian, that their origin is almost unrecognizable. And having thus a purely Gaurian form, it is no wonder, that they are subject to Gaurian law, and admit no *oblique form* at all ; that is, they belong to the *proper Gaurian* element. I ought to mention, however, that Dadobā (in his Grammar, §. 198., p. 72) does not admit these neuters at all ; neither is any of them found in Col. Vans Kennedy's Marāṭhī dictionary ; and, lastly, Marāṭhī Paṇḍits of Benares, of whom I have enquired, do not know them.‡ Even according to the *Manual* which enumerates them on p. 29., §. 67, 7., they are only a very few (about 18 altogether) ; and even of these some are optionally *Prākṛitic* and admit the *oblique form* in **आ** or **आ**. They are the following **अवाँ**, **उडँ**, **उवाँ**, **बडँ**, **चाँचूँ**,

\* In Bangālī **उअ** or **उअ** commonly change to **औ**, see Forbes' Gr. pp. 160-4.

† The separation of a compound consonant by means of an inserted euphonic **अ** or **इ** is rather common in Gaurian.

‡ I have seen, however, since that Molesworth gives them all in his dictionary.

बाँहूँ, जावूँ, डाँटूँ, पचेरूँ, पाँफूँ, हाँहूँ, झूँ, \* \* अगरूँ, \* \* राजारूँ, \* बरूँ, \* बरूँ, \* कुँ, \* कुँ. Those marked with two asterisks have optionally an *obl. form* in वा, and those marked with one asterisk an *obl. form* in वा. This latter fact is explained by the circumstance, that, as has been already noticed, the deterioration of the termination अकं (or अथ) to उकं (or अथ) took place, as it were, on the confines of the Prākṛit and Gaurian, and that, therefore, the neuter nouns which exhibit this deterioration, are sometimes treated as *Prākṛitic*, sometimes as *Proper Gaurian*. As regards the two other classes; that which has the *oblique form* in वा (*i. e.*, 1st class), contains all the neuter nouns in ऊँ,\* the only exceptions being those already mentioned as *proper Gaurian*, and the following nine nouns गलूँ *boil*, जूँ *yoke*, तारूँ *ship*, धरूँ *haft*, रूँ *scar*, वरूँ *iron ring*, बोलूँ *sauce*, पाँहूँ *branch of a river*, पेलूँ *boil*, which form together with those marked with two asterisks in the list of *proper Gaurian* neuters (hence altogether 13) the 2nd class, *i. e.*, that which has an *oblique form* in वा. The paucity of the nouns of this class cannot surprise, if we consider, that the deterioration of the termination अकं into उकं can only have taken place quite exceptionally.

Next, we come to the Gujarāṭi and Naipālī neuter nouns in ऊँ, and the Marwāri neuter nouns in औँ. They all have an *oblique form* in वा, and are evidently, as regards the formation both of the *direct* and *oblique form*, identical with the first class of the Marāṭhī neuter nouns in ऊँ. *E. g.*, *gold* in Naipālī is सेनूँ; in Sanskrit it is सुवर्ण, in Prākṛit सुवण or सुवणक or सुवणथ. The last form सुवणथ becomes in Gaurian सेनौँ, and this changes to सेनूँ, and this to सेनौँ, which last is the present Gujarāṭi *direct form* of the word. Now the genitive of the Prākṛit सुवणथ is सुवणथस or सुवणथास or सुवणथाद. The last of these forms changes in Gaurian to सेनथा and this to सेना, which last form, with the addition, apparently, of a final nasal सेनौ (the meaning of which will be explained afterwards), is the present Gujarāṭi *oblique form* of the word. As another representative example, we may take the Gujarāṭi infinitive करवुँ *to do*, to which the Marwāri infinitive करवौँ corresponds. The derivation of these infinitives has already been explained. They are formed from the Sanskrit participle future passive in तव्य. The Sanskrit is कर्तव्य, in early Prākṛit this is (करितव्य or) करितव्य, in later Prākṛit करिव्य or करव्य or amplified करव्यथ,† the last of these करव्यथ changes in Gaurian to करवौँ, which is the present Marwāri *direct form* of the word,

\* To this class of neuter nouns belong all Marāṭhī diminutives, which are neuter nouns in ऊँ or डूँ.

† This amplified form करव्यथ admits a two-fold explanation. Either it may be formed from the form करव्य by the usual addition of the affix थ (being originally करव्यथ); or, which is perhaps more probable, the affix तव्य may have become in

and next to करवूँ or करनुँ, which last is the present Gujarátí *direct form* of the word. Now the genitive of the Prákrit करवच्च is करवच्चस्स or करवच्चस्स or करवच्चस्स. The last of these changes in Gaurian to करवच्चा and finally (contracted by Gaurian law) to करवा which is the present Gujarátí and Marwáří *oblique form* of the word. The Naipáli neuter nouns in व are the infinitives. While, e. g., the Gujarátí has करवूँ to do, and the Marwáří करवोँ, the Naipáli has करनुँ.\* The derivation of these infinitives has also been already explained. They are derived from the Sanskrit participle future passive in वनीय. The Sanskrit therefore is करणीय; in Prákrit it is करणीय or करणिय and (broadened) करवच्च. This last form करवच्च changes in Gaurian to करवोँ (or करवोँ) which is the present *direct form* of the word in the Braj Bháshá, next to करनू which is the present Alwarí *direct form* of the word, and, finally, to करनुँ, which is the present Naipáli *direct form* of the word. Now the genitive of the Prákrit form करवच्च is करवच्चस्स or करवच्चस्स or करवच्चस्स. The last of these becomes in Gaurian करवच्चा or, contracted by Gaurian law, करवा, which is the present Naipáli *oblique form* of the word.†

The final nasal which appears in the *oblique form* of Gujarátí neuter nouns in व is puzzling.‡ At first sight, one might take it as an inorganic

Prákrit, not only वच्च, but also वचयं and (with elision of य), वचयं, or वचियं (वचियं) and (broadened) वचयं (comp. vedic वक्ष्य having gone, Prák वक्षिय). In the latter case the process of development of करवूँ is this; Skr. कर्त्तव्यं, Prák. करिवचियं or करिवचयं = करिवचयं = करवचयं; Gaur करवोँ = करवूँ = करनुँ. In this case the single व of the Gaurian form is explained by the Prákrit itself. In the other case it must be explained by the Gaurian law according to which a Prákrit similar double consonant is reduced to the single consonant. The Maráthí form करवोँ is contracted either from the Prákrit form करवच्च (which becomes in old Gaurian करवचयं) or from the Prák. form करवचयं. (Compare the note at the end of the essay).

\* In St. Luke's gospel the Naipáli infinitive is spelled without the final nasal; thus करनु. This may be mere inaccuracy; or, if it is correct, we must assume that the original final nasal is dropped, as so often in modern Gaurian. This view is confirmed by the fact that traces of that Gaurian tendency of dropping the final neuter nasal, appear also in Gujarátí, where, according to Edalji's Grammar, the neuter may end in व as well as in वूँ e. g., gold is both सोनु and सोनुँ.

† This Prák. form करवच्च becomes in Gaurian contracted into करवोँ which is the present Maráthí *direct form* of the word.

‡ This final nasal, I think, should be written as an anusásika. In Hindí, at all events, all final and medial Gaurian nasals are anusásikas, but all medial (there are no final nasals of this kind) Sanskrit or Prákritic nasals are anuswáras. I am inclined to think that this rule obtains not only in Hindí, but in all Gaurian languages; it certainly does, as far as my limited acquaintance with the pronunciation of the other Gaurian languages enables me to judge. In Hindí, *kareyye* they will do "is करेँने not करेने; evening is सँवा (Skr. सन्ध्या, Prák. संध्या); true is सँच (Skr. सत्य, Pr. सच);

addition for a mere euphonic purpose, or to distinguish the neuter *oblique form* from the (otherwise identical and indistinguishable) masculine *oblique form*, or to assimilate the neuter *oblique form* to the neuter *direct form*. The addition of an inorganic final nasal occurs here and there in Gaurian, as e. g. in the negative particle **नाही** or **नहीं**, and in the noun **नैव** (Skr. नृच; Prāk. नृच). The Gujarātī Grammar of the Rev. Joseph Van S. Taylor does not admit a neuter *oblique form* with a final nasal at all (see §. 140. 44., pp. 26-29). Even in Mr. Sh. Edalji's Grammar the forms with the final nasal seem to be allowed only as optional (see §. 91., p. 40). Under these circumstances the conclusion appears to be justified that the final nasal is inorganic, and, in fact, an incorrect addition made perhaps for some reason like those suggested above. If, however, the final nasal should be organic, the only solution—by no means satisfactory to my own mind—that I can suggest for the present is this; the Sanskrit neuter nouns in **र** and **उ** insert a nasal (**व** or **व**) before the affix of the genitive; e. g., **वारि** *water* has Gen. **वारिवः**; **दधि** *curds* has Gen. **दधिनः**; **गुरु** *heavy* has Gen. **गुरुवः**; **मधु** *sweet* has Gen. **मधुनः**. In Prākrit this use, as an optional one, is extended even to the masculines in **र** and **उ**; e. g., **अग्नि** *fire* has Gen. **अग्निवो** (or **अग्निव**), **वायु** *wind* has Gen. **वायवो** or **वायव**. This renders it not improbable that perhaps in later or vulgar Prākrit that use was even more extended, viz., also to neuter nouns in **व**, so that, e. g., **सुवचं** *gold* would have not only

*saint* is **गोसाई** (Skr. Pr. and **गोखामी**); *where* is **कहाँ** (Skr. **किंस्थान**, Pr. **कथाने**); *in* is **ने** or **माहो** (Skr. **मध्ये** Pr. **मउम्वि**), etc., etc. In all these and like words, the nasal is pronounced by Natives as an *anusāsika*, not as an *anuswāra*. They are all *proper Gaurian words*. But in *Prākritic words*, as **खंवा** *healthy*, **खंवा** *long*, **घंटा** *clock*, etc., and in *Sanskritic words*, as **सन्ध्या** *evening*, **संयुक्त** *joined*, etc., etc., the nasal is pronounced by Natives as an *anuswāra*. The difference may, perhaps, be best illustrated by the French and English; *langage*, *exemple*, *environs* are pronounced with what Pandits would call the *anusāsika*, but *language*, *example*, *environs* are pronounced with what they would call the *anuswāra*. There is an essential difference between the two nasals. The *anusāsika* is a mere nasalization, which may be given to any sound (commonly to a vowel, but also to consonants), and therefore a mere modification of a sound (**वर्णवर्ण**) but not a distinct sound (**वर्ण**) itself; while the *anuswāra* is a distinct and separate nasal sound (**वर्ण**). See Max Müller's *Lectures on the Science of Languages*, 2nd vol., p. 164. Panini 1, 1. 8. 8, 3. 23. 24. In poetry the distinction of the two nasals is clear and important; the *anuswāra* makes the preceding vowel *always* long, while the *anusāsika* has no influence on it whatever. In modern printed books, unfortunately, the distinction between the *anusāsika* and *anuswāra* is very rarely and incorrectly observed. Those printed by natives are in this respect generally more exact, than those edited by foreigners. In future, in these essays all modern Gaurian nasals will be represented by the *anusāsika*. In quotations, however, from the oldest Hindi, of Chand, I shall, for the present, retain the *anuswāra*; as there may be some uncertainty as to the date, when the old *anuswāra* of the Prākrit was changed by the Gaurian into the *anusāsika*.

a Gen. सुवसस, but also सुवससो; and similarly सुवसस्य a Gen. सुवससस्य or सुवससस्यो. The latter form सुवससस्यो might easily originate the Gaurian forms सोनसन, next सोमान, finally सोनाँ. This theory appears to receive some confirmation from the Marwāṛī where the *oblique form* of the pronouns generally ends in स or the anuswāra, e. g., *his* is हसरा; it corresponds to the Hindi हसका; and as हस is a Prākṛit genitive हस्य (see Essay 2nd), so perhaps हस is a corruption of a Prākṛit genitive हसो (= Sanskrit हन्:)\*.

Next we proceed to the Marāṭhī neuter nouns in ईँ. Their *oblique form* ends in या. E. g., मिर्ती *pepper* is derived from the Sanskrit मिरिचि; in Prākṛit it is मिरिचि; in Gaurian मिरियं or, contracted, मिर्ती. The genitive of the Prākṛit मिरिचि is मिरिचस्य or मिरिचास or मिरिचाह. The last of these forms becomes in Gaurian मिरिचा or (contracted by Gaurian law) मियं which is the present Marāṭhī *oblique form* of the word. Again पाणी *water* is derived from the Sanskrit पाणीय; this becomes in Prākṛit पाणिचि (Pr. Pr. i, 18); and the latter changes in Gaurian to पाणी. The genitive of the Prākṛit पाणिचि is पाणिचस्य or पाणिचास or पाणिचाह, of which the last form changes in Gaurian to पाणिचा or पाणा, the present Marāṭhī *oblique form* of the word. Again दही *milk* is derived from the Sanskrit दधि; in Prākṛit it is दधि or दहिं or दहिकं or दहिचि. The last of these forms becomes in Gaurian दहिचि, and this contracts into दही. The genitive of the Prākṛit दहिचि is दहिचस्य or दहिचास or दहिचाह. The last of these forms changes in Gaurian to दहिचा, and is contracted into दह्या, the present Marāṭhī *oblique form* of the word. Again मोती *pearl* is in Sanskrit मुक्ता (or मौक्तिक); in Prākṛit it is मोता or मोतिका or (diminutive) मोतिकं or मोतिचि. The last of these forms becomes in Gaurian मोतिचि, and this contracts into मोती. The genitive of the Prākṛit मोतिचि is मोतिचस्य or मोतिचास or मोतिचाह. The last of these changes in Gaurian to मोतिचा, and is contracted to मोत्या, the present Marāṭhī *oblique form* of the word.

There remain for consideration the Marāṭhī neuter nouns in ईँ and the Hindi neuter nouns in ओँ, औँ, औँ. To these is to be added a Naipālī class of neuter nouns which I have only met with in the *oblique form* ending in या, and the *direct form* of which, I think, would probably end in ओँ or perhaps in औँ. A comparison of the passages, in which the Naipālī *oblique form* in या occurs, shows us the following points concerning them; 1., they are (adjective) nouns of agency; e. g., St. Luke viii. 5. एक बीज बरन्या निकस्यो, i. e., High Hindi एक बीज बोनेवाला निकला; again हस बसपि ऊन्या लार देह; i. e., H. H. हस बसपिवाले को देह; again St. Luke xxii. 21. मलार पन्नाडन्या को चान, i. e., H. H. मुन्ना को पकड़नेवाले का चाय; again St. Luke xxii. 20, मरा बरन्या रजन को मजा या हो; i. e. H. H. मेरे बरनेवाले रत्न के मारे हैं; again बिचाडन्या दिन, i. e., H. H. बिचान का दिन. In the two last examples the *oblique form* is clearly an adjective (qualifying रत्न and दिन); but in the others also it is an adjective, though put by itself and thus used substantively.

\* See, however, a note at the end of this essay.

Further in the first example we have it as a nominative ; in the second as a dative ; and in the fifth as a genitive. 2., These *oblique forms* belong to words which are equivalent to Hindi and Marāṭhī infinitives or gerunds ; this can be seen clearly by comparing the Hindi and Naipālī in the above examples ; compare also Naipālī जन्माउन्ना दिन with Hindi जनने का दिन ; and Naipālī करन्ना की प्रेरना with Marāṭhī करणा की प्रेरणा, etc. 3., These *oblique forms* are *genitives*. This may be seen from the fact that in the above examples विसाउन्ना दिन and जन्माउन्ना दिन the *oblique forms* विसाउन्ना and जन्माउन्ना are equivalent to the Hindi genitive विद्याम का, जनने का. Again सुनन्ना in Naipālī is = सुननेवाला *a hearer* ; the plural of it is सुनन्नाचेर, lit. *hearer's multitude* = सुननेवाले का घेर. Here सुनन्ना in the plural word is clearly in the genitive case. A little consideration will show, that, in fact, these *oblique forms* cannot be anything else but genitives. The words to which they belong are, as we have seen, infinitives, that is, verbal nouns expressing *an act*. On the other hand, the *oblique forms* themselves are, as we have also seen, adjective *nouns of agency*. Now the only way of turning a noun expressing an act, into a noun expressing an agent doing that act, is by putting it in the genitive case and supplying a common noun (as man) either expressed or understood. By doing this, the noun of act in the genitive case becomes equivalent to an adjective expressing the possession of the act by the supplied noun which is qualified by the adjective, e. g., सुनना is *hearing* ; and the genitive सुनने का, if मनुष्य *man* be supplied, (i. e., सुनने का मनुष्य or Naipālī सुनन्ना मानिस), is a *man of hearing*, that is, *a man who hears*. Here सुनने का or सुनन्ना is equivalent to an adjective. The word मनुष्य need not be expressed, and the adjective may be used by itself as a substantive noun of agency.

Now if these Naipālī *oblique forms* in या *must* be genitives, they can only be Prakṛit (organic) genitives, modified, of course, by Gaurian phonetic laws. It has been already shown that the Gaurian infinitives or gerunds are identical with the Sanskrit or Prakṛit future participles passive. And it can be easily shown that, according to the phonetic process explained in the beginning of this essay, the Gen. Sing. of the Prakṛit will assume the Naipālī *oblique form* in Gaurian. E. g., to hear (the dhātu) is श्रु ; the Skr. Part. Fut. Pass. of it is श्रवन्शीष्, in Prak. श्रवशीष् or श्रवशिष् ; the Prak. Gen. is श्रवशिष्शस् or श्रवशिष्वास or श्रवशिष्वाश्. The last form changes probably in late Prakṛit to श्रवशिष्वा or सुननिष्वा, and finally is contracted in Gaurian (by *Sandhi* according to Gaurian law) to सुनन्ना, which is the present Naipālī form of the word.

This view of the Naipālī nouns of agency in या, is confirmed by the Bangālī, which possesses nouns of agency in बनोवा and दवा, as करनिवा or करिवा *doer* (see Sama Churn Sircar's Grammar pp. 149., and 153.)\* To the

\* The forms in वा and दवे, as करा and करिवा *doer* are probably, merely contractions of those in दवा and बनिवा.



Naipālī सुन्या *hearer* and the Hindi सुनने would correspond the Bangālī सुननिया; and to the Hindi form (in Braj Bhāshā) सुनवे or सुनिवे- or (in Marwārī) सुनवा (the alternative Low Hindi forms of सुनने) would correspond the Bangālī सुनिवा. It is evident that the Bangālī nouns of agency in अनिया and दवा are derived from the two Skr. and Prāk. Part. Fut. Pass. in अनिय and नव in the sense of the infinitive or of a noun expressing act; and that (as regards form) they are equivalent to the organic genitive of those participles, and thus came to signify the agent. Thus the Part. Fut. Pass. of the root श्रु (Prāk. सुह) to *hear* is either सुनलोच (Skr. श्रवलोच) or सुनिचव्य or सुनिच (Skr. श्रोतव्य). The genitive of the former (सुनलोच or by Sandhi सुनलोच) is सुनलोचस्य or सुनलोचास or सुनलोचाव, of which forms the last changes in Gaurian to सुननिया, the present Bangālī form of the word. Again the genitive of the other Prākrit form सुनिचव्य or सुनिच is सुनिचव्यस्य or सुनिचवास or सुनिचाव, of which the last form changes in Gaurian to सुनिवा, the present Bangālī form of the word.

The Bangālī nouns of agency in अनिया and दवा (or दये and दवा) and the Naipālī nouns of agency in या are, then, Prākrit genitives, or, looked at from the Gaurian standpoint, *oblique forms*; they all require, to complete their sense of agency, the supplement of some common noun (as मनुष्य *man*). This noun is, however, suppressed and in course of time the real genitive-nature of those nouns of agency was forgotten, and they came to be considered as regular original adjective or substantive nouns;\* and, accordingly, to be declined as if their form were a nominative singular. Hence we meet in Naipālī with a genitive सुनया को, Dat. सुनया लार्, as if सुनया were the Nom. Sing. e. g., St. Luke xxii. 21.; तर देव मलार पक्राडया को चात मेरा सैम सौच साधि ह, (i. e., H. H. मेरे पक्राडनेवाले का चाय, etc.); or St. Luke xix. 24. दस बरपि उया लार् देउ (i. e., H. H. दसबरपिनेवाले को देा). Similarly in Bangālī the nouns of agency may be declined. In illustration of this phenomenon, I may refer to a parallel one in German. Some of the modern German surnames are the Latin genitive of original Christian names; but now they are considered and are declined as regular original nouns in the nominative case. E. g., such names as *Jacobi*, *Georgii* are really genitives to which filius "son" is to be added; *Jacobi* meant originally, the son of Jacob; *Georgii*, the son of George; and they are declined as *Jacobi philosophia*, the philosophy of Jacobi, as if *Jacobi* were a nominative. Similarly such names as *Stevens* are really genitives; for *Stevens* is properly *Steven's* son.

\* A very similar phenomenon happened in the formation of the *direct form* of the plural in some Gaurian languages; e. g., Naipālī सुनयाचेर *hearers* (lit. *hearer's* multitude) corresponds to Hindi सुननेवाले, where some noun like *चेर* must be supplied. Thus Naipālī भोकाचेरpl. of भोको *hungry* = Hindi भूके (or complete भूके *चेर*). This will be fully discussed in a future essay on the inflexional base of the Plural.

We must return now to the examination of the Maráthi neuter nouns in *र* and Hindi neuter nouns in *बोँ, बीँ, जँ*. The oblique form of the Maráthi neuter nouns in *र* ends in *बा*; that of Hindi neuters in *बोँ, बीँ, जँ* ends in *र*. E. g., *done* in Maráthi is *केले*, oblique form *केला*; in old Hindi it is *कियौ* or *कानौ* oblique form *काये* or *काने*;—*high* is in Maráthi *उचे*, oblique form *उचा*; in (High) Hindi *ऊँचा* (Braj Bháshá *ऊँचौ*, old Hindi *ऊँचौ*), obl. form *ऊँचे*;—*doing* is in Maráthi *करणे*, obl. form *करणा*, in Hindi (Braj Bh.) *करनौ*, obl. form *करने*, etc., etc. Here we see that the Hindi terminal *र* always stands in the place of a Maráthi terminal *बा*. Now if we put together this fact with the other fact, already stated, that in Gaurian the syllable *बा* (or *बब, दब, etc.*) is often contracted into the diphthong *र*; and also with the fact noticed before, that the Naipáli oblique form in *बा* corresponds to the Hindi oblique form in *र*, (as Naipáli *कन्बा* to Hindi *करने*); the conclusion must necessarily be drawn, that the terminal *र* of the Hindi oblique form of nouns is a contraction of an original termination *बा*; and this will apply not only to the termination of the oblique form of Hindi neuter nouns, but also to that of Hindi masculine nouns in *बो* or *बा*; for, e. g., the Hindi masculine noun (*घोड़े* or) *घोड़ा* horse is identical with the Maráthi (*घोडे* or) *घोडा*; and the oblique form of the latter *घोड़ा* must also be identical with the oblique form of the former *घोड़े*; and so forth.

The next question is, what is the origin of this original termination *बा* of the Gaurian oblique form of neuter nouns in *बोँ, बीँ, जँ, र*, and their corresponding masculine nouns. Here the infinitives afford us again a clue to its right interpretation. A Hindi infinitive is, e. g., *करनौ* to do; we have seen, it is derived from the Prákrit *करलीचं*. Now *करलीचं* changes in the Nom. case successively into *करलिचं, करलचं, करनौ* or *करनू*. In the genitive case it changes successively from *करलीचस्स, करलिचस्स* to *करलिचाव करलिचाव, करलिचा, करन्या, करने*. And thus by phonetic changes, perfectly regular, natural and easy, we arrive at the direct form in *बोँ* and *जँ*, and the oblique form in *र* of the Hindi neuter nouns. And the conclusion we draw, is that the termination *बा* of the Gaurian oblique form is a contraction of the termination *रचस्स* of the Prákrit genitive; and this is the case also with all Hindi neuter nouns which are not infinitives. E. g., the oblique form *किये* of the neuter noun *कियौ* *done* must represent a Prákrit genitive *किरचस्स* (for *किरिचस्स* = Skr. *कृतकस्स*), which must have changed successively into *किरचाव, किरचाव, किरचा, किया, किर* or *किये* (with euphonic *ब*). Perhaps at first sight there will seem to be a difficulty in this theory. In the case of the infinitive *करनौ* both the direct form in *बोँ* and the oblique form in *र* were traceable to an original Prákrit base in *रच*; on the other hand, as regards all other Hindi neuter nouns in *बोँ* or *जँ* (as, e. g., *कियौ*, etc.) their direct form in *बोँ* is derived from a Prákrit base in *बब*; while, if the theory be correct, the oblique form in *र* must be derived from a Prákrit base in *रच*. In other words the theory necessitates

the assumption that Prākṛit bases which in the nominative case ended in **अव** changed or deteriorated in the genitive case into **इव**.\* To illustrate this, let us take again the case of **कियो** *done*. Its *direct form* represents a Prākṛit nominative **किदक**, which changed successively into **किअव**, **कियो** or **कियो**, **कियो**. The *oblique form*, as we have just seen, postulates a Prākṛit genitive **किदिकस**, that is, the Prākṛit nominative **किदक** or **किअव** with a base in **अव**, has a genitive **किदिकस** or **किइअस** with a base in **इव**. Now though this change may surprise at first sight, there is really nothing irregular or extraordinary in it. It is a phenomenon which under certain phonetic circumstances regularly occurs. I have had occasion already to notice that the base termination **अव** (**अक**) has a tendency to degenerate into **इव** (**इक**) or **उव** (**उक**). Thus we have in the Mirchchhakati **केरिअ** besides **केरअ**; and **विह्वो** for **ह्विअ**, etc.† But the change has become an absolute rule in the feminine. Bases which in the masculine end in **अक** (**अव**) change always in the feminine into a base ending in **इक** (**इव**), and this rule obtains already in Sanskrit; e. g., Skr. masc. **बालक** *boy*, but fem. **बालिका** *girl*; Prākṛit masc. **बालवो**, fem. **बालिआ**, etc. The reason of this change, probably, is that, as the ultimate in the feminine is heavily weighted (by changing **अ** to **आ**), the penultimate is lightened (by changing **अ** to **इ**). Now under exactly the same circumstances the same change evidently takes place in the later or vulgar Prākṛit declension of bases in **अक**. Take again the example of **किदक**. The Nom. sing. is **किदको**. The Gen. **किदकस** or **किदकाव** or **किदकाव** or **किदका**. At this stage, I think, the change must have taken place; the form **किदका** would correspond exactly to an original feminine form **बालका**; and as the latter changed to **बालिका**, so the former changed to **किदिका**, and for the same reason; because the ultimate had become **आ** for **अ**, the penultimate was shortened to **इ** for **अ**. Next **किदिका** or **किइआ** changed to **किया**; and this to **किर** or **किये**. This theory applies equally to Hindi masc. nouns in **वो** or **वा**. Take, e. g., **घोड़ा** *horse*. It is derived from the Prākṛit base **घोडक** or **घोडव**, which in the feminine becomes **घोडिका** or **घोडिआ**. The Nom. Sing. of the Masc. is **घोडको** or **घोडवो**, which in Gaurian is contracted into **घोड़ा** and changed to **घोड़ा**. The Gen. Sing. of the masc. is **घोडकस** or **घोडवस**, which changes successively to **घोडकाव**, **घोडकाव**, **घोडका**, **घोडिआ**, **घोड़ा**, which is the present Marāṭhī *oblique form*, and finally to **घोड़े**, which is the present Hindi *oblique form* of the word.

There is another explanation possible of the Hindi *oblique form* in **इ** which is not open to the difficulty just now discussed. But it is open to

\* It should be noted, however, that, as explained previously, the Hindi infinitive termination **वो** or **व** requires a change of the original Prākṛit termination **एव** to **अव**; so that, practically, there is no difference in this respect between Hindi infinitives and other Hindi neuter nouns.

† See also some more examples in the note 5 on page 105.

other difficulties; not only to *one*, but several, which moreover are more serious and much less capable of being surmounted. The explanation is this. The Gaurian diphthong ए can be not only a contraction of वा, but also of ववा. If we suppose the latter to be the case in the Hindi *oblique form* in ए there is no necessity of assuming a change of the Prākṛit base termination वव into एव. In this case the *oblique form* in ए (e. g., किये) is to be explained thus; the Prākṛit genitives कियवस्स or कियवस्स change to कियववस्स to कियवव or कियवा. At this stage, as I have shown on former occasions, the word passed into Gaurian, and, according to Gaurian rule, either Sandhi must take place, or a euphonic letter must be inserted, to prevent hiatus. The question is, which of these two alternatives happens. According to the present theory we must assume that the euphonic letter व was inserted. Hence we get कियवा which finally changes to किर or किये. So far there is no difficulty; on the contrary it obviates the difficulty involved in the other theory of changing the base in वव into one in एव. But there is positive evidence to show that of the two alternative cases just now mentioned, not the one here assumed (*viz.*, insertion of व), but the other (of Sandhi) took place in reality. In Maṛwārī, namely, the *oblique form* is not किये but किया, and what this fact indicates is this, that in the form कियवा when it passed into Gaurian, not the insertion of a euphonic consonant व, but *Sandhi* of the hiatus-vowels (व and वा) took place; *viz.*, कियवा was contracted into किया or (with euphonic ए) किये. Evidence of the same fact is the Naipālī and Gujarātī with their *oblique form* in वा, which, as I have already shown, is the contraction of a terminal form ववा; e. g., Gujarātī सोण gold, obl. form सोना; equivalent to Prākṛit Nom. sing. सुववस्स and Gen. sing. सुववस्सस्स, or सुवववव, or सुवववव, or सुवववा, and contracted सोना. It follows from all this that if the Prākṛit base in वव remained unchanged in the process of transition of the Prākṛit into Gaurian, the termination of the Prākṛit genitive was contracted by *Sandhi* into वा, and not changed, by the insertion of a euphonic व, into ववा; and hence the origin of the termination ए must be differently explained. And the explanation is, that there was an alternative case; in some places the Prākṛit base in वव remained unchanged, and gave rise to the *oblique form* in वा; in other places the Prākṛit base in वव was weakened to एव, and thus gave rise to the *oblique form* in ए or ए. E. g., the base सुववव gold remained unchanged in Gujarātī and its genitive सुवववा (for सुवववस्स) was contracted to सोना; while in Hindustān, it was weakened to सुववि, and its genitive सुवविवा was contracted to सोवा or सोवे.

The objection explained in the preceding remarks is only one of the reasons against the derivation of the termination ए of the Hindi *oblique form* from an original termination ववा. I shall now proceed to state a few more reasons against it, in order to remove as much as possible, all doubts as to the truth of the theory, that the termination ए stands for वा, and this for एवा (= एवा).

2. A second reason is this. To the Hindî *oblique form* in ए the Maráthi *oblique form* in वा corresponds and both must have an identical derivation. Now though ए may be explained as a contraction of एवा in Hindî, this cannot be done with Maráthi वा. In Maráthi the initial consonant व of the syllable वा is always compounded with the final consonant of the base. There does not seem to be any trace that it may be separated from the final consonant of the base, and pronounced as एवा; e. g., the *oblique form* of घोड़ा *horse* is घोड़ा, but not घोड़ा. In the case of the *oblique form* in वा, the *Manual* admits an alternative form in एवा; e. g. नाव *ship*, obl. form नावा or नावा; but in the case of the *oblique form* in वा neither the *Manual*, nor Dadobas's Grammar, nor any other grammar that I have consulted, admits an alternative form in एवा. If it had existed at all, it would surely have been mentioned by one or other of the grammars. Even the alternative form एवा is doubtful, seeing that it is only mentioned by the *Manual*; but the alternative एवा, it appears, does not exist at all. Now this fact would be very improbable on the supposition that the form in एवा is the original one, out of which the other (the present) form in वा arose by the suppression of the medial व. Such a suppression of a medial व, indeed, is not uncommon in Gaurian; but whenever it occurs, both forms remain equally current, the original one without the suppression and the derived one with the suppression; and at all events, whatever the pronunciation may be, the spelling wherever accuracy is observed, follows the origin of the word. Thus in Hindî, though *he knows* is pronounced *jántá* it is always by correct Nágari writers spelled *jánatá* (i. e., जानता, not जाना). Now neither of these is the case with the Maráthi *oblique form* in वा; it is always spelled with the व compounded with the preceding consonant, and always so pronounced. Even if we should rely on the analogy of the *oblique form* in वा, it would not help us out of the difficulty. For, as I have shown formerly when treating of the Maráthi neuter nouns in अ, the case is just the reverse with the obl. form in वा. There the original form is that in वा and the derived form is that in एवा, i. e., with the insertion of a euphonic व to prevent the necessity of pronouncing a compound consonant; such insertion being also not uncommon in Gaurian. If, therefore, the analogy of the *oblique form* in वा proves anything, it proves the very thing demanded by my theory; viz. that the form in वा is the *original form*; and if a form in एवा should exist, it could only be a vulgar corruption of the form in वा with inserted व. Further, it should also be noted, that even if two alternative forms in वा and एवा should exist, this fact, though it might allow the opposite theory, would in no way contradict my theory; (for the form in वा, as just shown, might be the original one); while if only *one* form in वा exists, this fact is altogether fatal to the opposite theory, but accords entirely with my theory. It seems certain, then, that, at all events in Maráthi, the termination वा of the obl. form is *original*, and not reducible

to a form in **या**. But if this is the case, the Hindi corresponding termination **ए** must also be a contraction of an original termination **या**, and not **या**. And further it follows, that both in Maráthi and Hindi, the Prákrit base from which this oblique form in **या** and **ए** is derived, must have ended in **या**.

3. In Maráthi there is one exception to the rule that the initial consonant **य** of the obl. form termination **या** is compounded with the final consonant of the base. It is the gerund in **जावे**. According to both the *Manual* (see § iii, III.) and Dadoba's Grammar (see §. 463.) the *oblique form* of these gerunds does not end (as we should expect according to the analogy of other neuter nouns in **ई**, as **करवे** [obl. form **करया**], **उवे** [obl. **उया**]) in **या**, but in **यावया**; e. g., **करावे** to do, obl. form **करावया** (not **कराया**), **जावे** to go, obl. form **जावया** (not **जाया**). Here the alternative form in **या** does not exist at all. Now this exception proves the rule extremely well. It has been observed several times already that these Gaurian gerunds or infinitives in **जावे** are derived from the Skr. and Prák. Part. Fut. Pass. in **तव**, and it has been shown in a previous place, that the Sanskrit termination **तव** may become in Prák. **ववयं**; thus Skr. **कर्तव्यं** becomes Prák. (**करिववयं** or **करिववयं** or **करववयं**). The genitive of the latter form is **करववयस्सु**, which changes to **करवयास** or **करववयास** or **करववया**. Here the form passes into Gaurian which, according to its law, contracts the form, by Sandhi of the hiatus-vowel, into **करावया**; and thus we obtain the present Maráthi *oblique form*. Now let it be noted that here the semivowel **य** is not a euphonic insertion of the Gaurian, but an original, integral part of the word, taken over from the Prákrit. The case would be very different with any other neuter nouns, as e. g., **उवे** *high*. In Prákrit this neuter would be **उवयं**, which in Gaurian would become **उवयं**; the genitive of the Prákrit **उवयं** would be **उववयस्सु** or **उववयास** or **उववयास** or **उववया**, in which last form it passes into Gaurian, and now if we are to obtain the form **उवया**, we must assume that the Gaurian inserts a euphonic **य**. This, as we have seen, is not the case; the Gaurian, on the contrary, makes Sandhi under these circumstances; we should obtain the form **उवा**. We see, therefore, that the reason why the *oblique form* of the Gerund in **ई** differs from the *oblique form* of other neuters in **ई**, is this, that the consonant **य** of the former is organic, while the **य** of the other neuters would be an inorganic euphonic insertion. But, as I have proved by examples from the Gujarátí, Naipálí and Marwárá, it is contrary to the habit of Gaurian to insert **य** in this particular case; it prefers to make Sandhi. Hence the difference under discussion proves, that the oblique form in **या** must be explained in an altogether different way, and the theory advanced by me, that it is the modified genitive form of a Prákrit base in **या** fulfils all the requirements of the case.

4. The *oblique form* in **या** is not altogether peculiar to Maráthi neuter nouns in **ई**, but it belongs also to the Maráthi neuter nouns in **ई**. New

the *oblique form* of the latter originated, as I have shown formerly, from the genitive of Prākṛit bases in **रच**; and, as there is no reason to suppose that the *oblique form* in **वा** of the neuter nouns in **र** differs in nature from it, the former must also be derived from the genitive of Prākṛit bases in **रच**. E. g., **दही** *curds* has the oblique form **दह्या**, i. e. **दहिवा** = **दहिवाच** = **दहिवास** = **दहिवाच** (**दहिवच**), which is the Gen. sing. of a base in **रच**. Similarly **सोना**, the obl. form of **सोने** *gold*, must be **सोनिवा** = **सुवहिवाच** = **सुवहिवास** = **सुवहिवाच** = (**सुवहिवच**), i. e., the Gen. sing. of a base in **रच**.

There can be little doubt, then, I think that the Marāṭhī *oblique form* in **वा** postulates a Prākṛit base in **रच**, and so also the Hindī *oblique form* in **र**, which is evidently identical in nature with the former. And I may here add, that this is true also of the Panjābī *oblique form* in **र** which is identical in nature and form with the Hindī obl. form in **र**. In consequence, it must be assumed that while the *direct form* in **र**, **बौ**, **बौ**, **जौ**, of neuter nouns is derived from the nominative Sing. of a Prākṛit base in **वच**, the oblique form in **वा** of the same nouns is derived from the genitive Sing. of a Prākṛit base in **रच**, into which the Prākṛit base in **वच** degenerated in the course of transition into Gauṛian, in consequence of the final of the word having become heavily weighted in the genitive.

5. Moreover in Hindī, there is one instance which affords us positive evidence of the fact, that the obl. form termination **र** is equivalent to **वा**, and not to **वाच**. The *oblique form* of the *proximate* demonstrative pronoun in the Braj Bhāshā, is **वा**; on the other hand in Gaṇwāri it is **र**. E. g., *in this* is in the Braj Bhāshā **याने**, in the Gaṇwāri **रने**; *of this* resp. is **वाको** and **रकर**; *to this* **वाको** and **रको**, etc. There can be no doubt that the Gaṇwāri **र** is merely a contraction of the Braj Bhāshā **वा**. This is easily confirmed by a further comparison of the Gaṇwāri and the Braj Bhāshā. It has been already remarked that in Gauṛian **वा** is often contracted to **र**, **वा** to **बौ**, **व** to **र**, and **व** to **ज**. Now the Braj Bhāshā *oblique form* of the *distant* demonstrative pronoun is **वा** and this, in the Gaṇwāri, is represented by **बौ**; e. g., Braj Bhāshā has **वाको**, **वाको**, **वाने**; but the Gaṇwāri **वाकर**, **वाको**, **वाने**. Again while the Braj Bhāshā has **वहाँ** *here*, **वहाँ** *there*; the Gaṇwāri has **रहाँ** and **रहाँ**.

There is still a point remaining for settlement concerning these neuters; viz. the Prākṛit original of the final **र** of the *direct form*. The Marāṭhī final **र** corresponds to the Hindī final **बौ**, **बौ**, or **जौ** (High Hindī **वा**); e. g., Marāṭhī **सोने** *gold* is equal to Low Hindī **सोनी** or **सोनी** (H. H. **सोनी**); Mar. **करने** *done* is = Hindī **कियो** (H. H. **किया**); Mar. **करने** *doing* = Hindī **करने** or **करने** (H. H. **करना**), etc. The terminations **बौ**, **जौ**, there can be no doubt, are the modifications of the Prākṛit terminal form **वच**. It is, therefore, *prima facie* probable, that the Marāṭhī **र** is also a modification of the Prākṛit termination **वच** into **वच** by inserting **व**, which **वच** afterwards contracted into **र**. But this is merely Gauṛian law; and the existence of

neuters in अव्यं in early Gaurian has been already amply proved. But there are two circumstances, which would seem to indicate a different derivation of the Maráthí final रं; viz. from a Prákrit final रच्, which in early Gaurian would become रचं (with insertion of euphonic च्). Those two circumstances are; 1. that the original of the termination रं of the Maráthí gerunds in रं (or रें) is the Prákrit termination रच्, (e. g., करणे *doing* is contracted from Prákrit करणिच्), and that by parity, all Maráthí neuters in रं are derived from Prákrit neuters in रच्. 2, that as the *oblique form* in वा of these neuters in रं is derived from the genitive of a Prákrit base in रच्; if we derive the *direct form* in र from the nominative Sing. of a Prákrit base in रच्, all difficulty attending the derivation of the oblique form is removed. Though it must be admitted, that these reasons are of considerable force, yet I think, the reasons which decide for the other view outweigh them. These are, 1., that it equalizes the derivation of the neuter nouns which are common to both Maráthí and Hindí; while the Prákrit termination रच् (old Gaurian अव्यं) would explain easily the Gaurian neuters ending in रें, रं, as well as रं, the Prákrit termination रच् would only explain the Maráthí ending रं, but not the Hindí ending रें or रं, for which we would have to keep the Prákrit termination रच्. 2., There is the Maráthí neuter termination रं which, to a certainty, is contracted from the Prákrit neuter termination रच्; if the Maráthí neuter termination रं be also taken as a contraction of the Prákrit termination रच्, there is no intelligible reason, why in some words the ending रच् should have been contracted into रं and in others again into रं. On the other hand, there is a very good reason for this difference, if we suppose that originally neuter nouns ended partly in रच्, partly in रचं; and those ending in रचं contracted their final into रं, while those ending in रच् contracted it into रं. E. g. सोने *gold*. is contracted form the Prákrit सुवचं, old Gaurian सोनचं; but दही *curds* is contracted from the Prákrit दहिच old Gaurian दहिचं.—3., Again to anticipate a point which will be fully gone into in the next essay; to the Maráthí neuters in रं correspond Maráthí masculines in वा; now according as the Maráthí neuter in रं is derived from an original form in रचं or रच्, the masculine in वा must also be derived from an original form in रचो (रचे) or रचो (रचे); but the form रचो yields much more readily the contraction वा (old Maráthí रो), than the form रचो, the latter could in the first instance give us only the contracted form रो; and though there is perhaps no absolute difficulty in assuming a contraction of रो to रो (as in उरो to उरो *high*),\* still it is not so easy and natural as the

\* In illustration might be adduced the High Hindí participle *past passive* in वा, for the Braj Bháshá ones in रो, as H. Hindí कृता, for Braj Bháshá कृती. Here कृता may have arisen by the elision of च् in कृता. But its origin may also have taken place in a different manner. The corresponding participles in Maráthí and in उरो, which stands for the Skr. ending रत्, e. g. read is पढ़ा, the Skr. is पठित, the



contraction of चो to चो (as in उचो to उचो).—4., while on the theory of the Prākṛit terminal form च being the original of the Marāṭhī terminal form र, the two objections to this theory (noticed above) can be reconciled; on the other hand, on the theory of the Prākṛit termination रच being the original, the three objections to this theory are incapable of being surmounted. As regards, namely, those two objections, it may be said: 1, that the ending र of the Marāṭhī gerunds in रे (or ने), though, no doubt, ultimately derived from a Prākṛit termination रच or रच may well be proximately derived from a Prākṛit termination चच. For it has been shown already that the Prākṛit Part. Fut. Pass. affix चरोच may change to चरिच (or चरिच) or चरच (or चरच).<sup>\*</sup> And this derivation

Prāk. (with the amplificative affix क) पडिदको or पडिदचो; in the more vulgar and broad Prāk. dialect it must have become पडदचो, this changed to पडडचो and finally to पडलचो; in Gaurian it was contracted to पडलो or पडला. We may well suppose that the affix रत was also in Hindī sometimes broadened in चत. Hence Skr. कश्चित् would become in Prāk. कश्दिदको or कश्दको. The latter form would change to कश्चचो or कश्चो or कश्चो or कश्चो which last is the High Hindī form of the word. The former form would change to कश्दिचो or कश्चो or कश्चो or कश्चो which last is the Braj Bhāshā form of the word. The extreme improbability of the Prākṛit termination रचो being contracted in Gaurian first to चो, next to चो or चो is illustrated by the word मूचिक mouse, which becomes in Gaurian मूसा or मूसा. Here the Gaurian termination चो or चो might be thought to be a contraction of the Sanskrit termination रुकः or Prākṛit रुचा. But if we turn to Prākṛit, we find the following sūtra in Subha Chandra's grammar, अपचिश्चिवीप्रतिशुद्धिभीतकश्चिद्रायाम् (II, 47, corresponding to Hema Chandra I, 88.); that is, the first रु of the words mentioned in the sūtra changes to च; hence the Skr. मूचिक becomes in Prākṛit मूचो, and this, now, changes in Gaurian to मूसा or मूसा.

<sup>\*</sup> The insertion of a euphonic च, which, as has been remarked in another place, has become one of the phonetic laws of Gaurian, is not altogether unknown to the later Prākṛit. Thus Hema Chandra in his Prāk. grammar gives the following sūtra चवर्चा चनुति I, 180, in Subhachandra the corresp. sūtra is चनुतिर I, 5, and the commentary thereon कमादिछोयेवर्चात् परो योऽवर्चावश्चिष्यते तच्च क्षुप्रप्रवर्ततचनुतिरिति, which means, that if a consonant which is preceded by च or चा and is followed by च or चा is elided, a euphonic च is inserted; some examples given are चयच (for चकच), निरचयरो (for नीरचरो), रचय (for रचय), etc. This sūtra limits the practice to a particular case. But in Gaurian there is no limitation; and there are not wanting evidences that even in later Prākṛit the limitation was not strictly observed. Thus Hemachandra himself in his commentary to sūtra I, 14, of his own grammar makes the following remark वज्रपाणिपादादीपत्क्षुद्रतचनुतिरिति, that is, by the rule of variety the semivowel च may be slightly pronounced, and he gives among others as an example चरिचा for Skr. चरित्. Also in the previously mentioned sūtra he mentions as an exception चिचर for Skr. चिचति. In all MSS., in my possession, both of his grammar and that of Hema Chandra the euphonic च is generally inserted in the Prākṛit examples; while in the MSS. of Vararuchi's Prākṛit Prakāśha it is never met with.

is rendered almost certain by the fact, that the Hindi equivalent of the Maráthí gerundial ending *करते* is *करने* or *करनू* which can only have arisen from a Prákrit ending *करवच*. Thus the Maráthí *करते* corresponds to the Hindi *करने* or *करनू*. Now the *proximate* original of the Hindi form *करने* or *करनू* must have been a Prákrit form *करवच*; hence it is probable that it was also, in the form *करवच*, the original of the Maráthí form *करते*; though the *ultimate* original of both forms (Hindi as well as Maráthí) was the Prákrit form *करलोच* or *करविच*. Moreover the word *पाणी* *water*, which is a contraction of the Prákrit form *पाविच* or *पालोच*,\* shows plainly, that if the Prákrit termination *वलोच* was modified to *विच* or *विच*, it changed its final in Gaurian according to rule into *ई*, and not to *ए*; and that, therefore, in order to explain the change of the ultimate Prákrit form *वलोच* to *करते* in Maráthí, we must assume, that first it was modified to *वच* or *वच* and afterwards *वच* to *करते*.—2., It has been proved already that there is nothing extraordinary or irregular in a change of a Prákrit base in *वच* in the Nom. Sing. to a base in *वच* in the Gen. Sing.

The conclusion, then, which we must draw, appears to be this, that the termination *ई* of Maráthí neuters is in all cases of substantives (as *घोने*), adjectives (as *उचे*), and participles (as *केले*), and probably in the case of gerunds (as *करते*) a contraction of the old Gaurian termination *वच* and the Prákrit termination *वच*.

In order to complete the subject of the neuter inflexional base, I may add, that in the modern literary form of the Hindi-class Gaurian languages (excepting Gujarátí) the final *anunásika* of the neuter *direct form* of the inflexional base is always dropped. Thus in High Hindi we have *करन* for the Braj Bháshá *करने* and Alwarí *करनू*.† Again compare *पाणी* *water* with Maráthí *पाणी*, and High Hindi *पलू* *potaloe* with Maráthí *पलू*; this is but the legitimate conclusion of a regular phonetic process affecting the final nasal. In Sanskrit we have final *न्*; in Prákrit final *न्* is toned down to the *anuswára*; in Gaurian the *anuswára* is attenuated to the *anunásika*; and in modern literary Gaurian finally the *anunásika* is dropped. The result of this process is the disappearance of the neuter gender in the modern literary Hindi-class Gaurian languages (excepting Gujarátí); for by the dropping of the final *anunásika* the neuter and the masculine become identical and indistinguishable in form; and hence were also not distinguished in gender.

It was remarked above when treating of the Maráthí neuters in *क* that the formation of the final *क* took place, as it were, on the confines or the debatable ground between Prákrit and Gaurian; and that, therefore,

\* See Hema Chandra I, 101. Śubha Chandra II, 59.

† Similarly the Dative post-position in High Hindi is *को* for Braj Bháshá *को*.

neuter nouns in **ञ** may be considered and treated as well as *Prákritic* as *Gaurian proper*. This remark applies with equal force to neuter nouns in **ई**. In Maráthi these neuter nouns in **ञ** and **ई** are *generally* considered as *Prákritic*, and treated accordingly; i. e., have an *oblique form* (as **पानी** *water*, obl. form **पान्या**; **आलू** *potato*, obl. form **आल्या**). But in the Hindi-class Gaurian languages, they are always considered as *proper Gaurian* and treated accordingly, i. e., have no *oblique form* (as Hindi, Gujarátí, etc. **पानी** *water*, **आलू** *potatoes* remain unchanged throughout the declension).

The next essay (No. V) will be devoted to the examination of the inflexional base of the masculine and feminine nouns with reference to the proof of these two points; that the *oblique form* is identical with the *Prákrit* genitive, and that the termination **जे** or **जा** of the *direct form* (of masculine nouns) is owing to its original being the termination of a *Prákrit* base, formed by means of the pleonastic affix **क**. This will also afford an occasion to examine an old Hindi *oblique form* in **हि** or **ह** and the inflexional base of the pronouns.

## APPENDIX.

*A table exhibiting the various stages of phonetic decay in the development of Gaurian from Prakrit and Sanskrit.*

## A. DIRECT FORM.

| Sanskrit. |            | Theoretical<br>or<br>(vulgar Skr.?) |  | Prakrit. |                    | Gaurian.                          |                                      |
|-----------|------------|-------------------------------------|--|----------|--------------------|-----------------------------------|--------------------------------------|
| Base.     | Nom. Sing. |                                     |  | Early.   | Late or<br>vulgar. | Old.                              | Modern.                              |
| सुवचं     | सुवचम्     | सुवचकम्                             |  | सुवचचं   | सोवचं              | { सोनी (or सोनवं?)<br>सोचयं ..... | सोनी B. सोना H. सोनुं G.<br>सोनें M. |
| पिब       | पिबम्      | पिबकम्                              |  | पिबचं    | पिबचं              | पिबो (or पिबवं?)                  | पिबो B. पिबूं M. पिबा H.             |
| मुक्ता    | मुक्ता     | सोक्तिकम्                           |  | सोक्तिकं | सोक्तिकं           | सोक्तिकं                          | सोनी M. सोती H.                      |
| स्यार्    | स्यार्     | स्यार्कम्                           |  | स्यार्चं | स्यार्चं           | स्यार्चं or स्यार्चो              | स्यार्चं M.                          |
| पिटक      | पिटकम्     | पिटकम्                              |  | पिटचं    | पिटचं              | पेसुचं or पेसो                    | पेसूं M.                             |
| पेटक      | पेटकम्     | पेटकम्                              |  | पेटचं    | पेटचं              |                                   |                                      |
| दधि       | दधि        | दधिकम्                              |  | दधिकं    | दधिकं              | दधिकं                             | दचो M. दरी H.                        |
| चमु       | चमु        | चमुकम्                              |  | चमुचं    | चमुचं              | चमुचं or चलो                      | चखें M. चखें H.                      |
| मधु       | मधु        | मधुकम्                              |  | मधुचं    | मधुचं              | मधुचं or मलो                      | मधूं M.                              |

[illegible]

**B. OBLIQUE FORM.**

[illegible]

| Sanskrit.                 |            | Prakrit.                       |                            | Gaurian.                |                    |                                                        |
|---------------------------|------------|--------------------------------|----------------------------|-------------------------|--------------------|--------------------------------------------------------|
| Base.                     | Nom. Sing. | Theoretical or (vulgar Skr. ?) | Early.                     | Late or vulgar.         | Old.               | Modern.                                                |
| Bases in च                | चमुकः      | चमुकस्य                        | चमुकाय<br>OR<br>चमुकाय     | चमुका                   | चंसा               | चंसा M.                                                |
|                           | चमु        | चमुकस्य                        | चमुकाय<br>OR<br>चमुकाय     | चमुका                   | चसा                | चसा <sup>1</sup> M.                                    |
| Gerunds in कृतिव and कृत् | करोषीव     | —                              | करोषीवाय<br>OR<br>करोषीवाय | करिषा                   | करसा               | करसा M. करने H.                                        |
|                           | पानीव      | —                              | पाणीवाय<br>OR<br>पाणीवाय   | पाणिषा<br>OR<br>पियणिषा | पासा<br>OR<br>पोसा | पासा M. (water)<br>पोसा M. पीने H. (drink)<br>करिने B. |
|                           | कर्णव      | करितवस्य                       | करिषवयाय<br>OR<br>—        | करिषा<br>OR<br>करिषा    | करिषा              | करिषा MB.<br>करने B.                                   |
|                           |            |                                | —                          | करिषा                   | करिषा              | करिषा MB.                                              |
|                           |            |                                | —                          | करिषा                   | करिषा              | करिषा MB.                                              |
|                           |            |                                | करिषवयाय                   | करिषवया                 | करिषा              | करिषा MB.<br>करिषा M.                                  |

| Miscellaneous. |        |                       |                          |              |                            |
|----------------|--------|-----------------------|--------------------------|--------------|----------------------------|
| मिरिच          | मिरिचक | —                     | मिरिचाव<br>OR<br>मिरिचाव | मिरिचा       | मिथं M.                    |
| मु             | मुमल   | { मुमल<br>OR<br>मुमकल | मुमल<br>OR<br>मुमकल      | मुमल         | मम M.                      |
| मुमु           | मुमुमल | —                     | मुमुमल<br>OR<br>मुमुमल   | मुमु<br>मुमु | मुमु H.<br>मुमु G. मुमु M. |



## NOTES TO APPENDIX.

*Note 1.*—M. = Maráṭhī; B. = Braj Bháshā; A. = Alwar dialect; N. = Naipálī; G. = Gujarátī; Mṛ. = Marwáří; H. = High Hindí.

*Note 2.*—The Prákrit grammars allow only those forms of this gerund, which change the compound consonant **ख** into **ख्** (see Pr. Prák. VII, 33); as करिख्ख or करेख्ख, to which Hemachandra adds also करिख् and करेख्. But the Gaurian dialects seem to postulate two more Prákrit forms of that gerund; viz. such as change the comp. cons. **ख** into **विख** or **वख**; and such as change the connecting vowel **इ** into **अ** (see my note on p. 83, 84); e. g., besides करिख्ख also करिखिविख or करिखिवय or करखवय. Now since writing the present essay, I have found that my conjectures are supported by the Páli of the rock inscriptions; e. g., in the Dhauli inscription occurs the form कडविख and in the ordinary Páli कानख् or कानख् besides करितख् (see Dr. Muir's *Skr. Texts*, Vol. II., p. 113, and Dr. Mason's *Páli Grammar*, p. 90). This is all the more important, as, no doubt, the Páli of the inscriptions represents much more closely the *spoken* language than the Prákrit of the grammars, which may have sacrificed sometimes the established but irregular forms of popular usage to the uniformity and regularity of a fancied rule.

*Note 3.*—The forms कुकुंख and कुकुंखा I have given on the analogy of two sūtras in Śubha Chandra's Prákrit Grammar (Adhy. I, Páda I, sūtra 14. 15.): कित् आनुनासिकम् ॥ i. e., whenever the technical letter **क** is added, an anunásika must be pronounced; and मोह यमुनायामुखानिमुक्तकामके ॥ i. e. in the (four) words yamuná, chámunḍá, atimuktaka, kámuka **न्** must be pronounced as an anunásika; e. g., ऊर्ध्वा, ऊर्ध्वा, etc. Perhaps we may assume, that in later and vulgar Prákrit the elision of consonants generally was compensated by the pronunciation of anunásika; and this conjecture might afford us another explanation of the puzzling final anunásika of the *neuter oblique form* in Gujarátī and Panjábī. E. g. if the elision of **क्** should be compensated by anunásika, we should have the Gen. सुवर्णाय for सुवर्णका; and सुवर्णाय would change to सोर्णाय, and finally to सोर्ण. This explanation, perhaps, appears less forced than that given above in the text p. 85, 86.

*Note 4.*—In the text (see above p. 60) I have explained that the Prákrit Genitives in **आय**, as सोयआय, drop the final **य**, and change to सोयआ. In support of this theory compare the remarks of Beames in his *Comp. Gram.* of the Modern Aryan languages of India p. 259., which I have received in the meanwhile. The only example given there is *Skr.* कर्षाय which in Panjábī is कर्षाय, but in Oríya कर्षा. A still more apposite evidence of my theory has since occurred to me in the Gaṅwáří (Hindí) *oblique form* of the *near demonstrative pronoun* which is ए or एय and corresponds to the Braj

Bhāshā form बा or बाहि. The original, namely, is the pronominal base *व* which is defective in Sanskrit, but in Prākṛit has a complete declension. The Gen. Sing. of *व* is in Prākṛit *वस* or *वसा* or *वसाव*, in which, in later Prākṛit, the *व* becomes changed to *anunāsika*, thus *वँसाव* (see note 8). Finally the form *वँसाव* becomes in Gaurian contracted (by sandhi) to *वव* which is Ganwāri, or to *बाहि* which is Braj Bhāshā. At the same time it is manifest, that the alternative forms *व* and *बा* must be contractions of an original Prākṛit form *वँबा* (with apokope of *व*). Similarly the *oblique* form of the second personal pronoun in the Ganwāri is *तो* or *तोव*, in Braj Bhāshā *तो* or *तोहि*. The original of these forms is the Prākṛit genitive *तुस* (nom. *तुसं*), or *तुसा* or *तुसाव* or (in late Prākṛit) *तुँसाव* or *तुँबा*. Of the two last forms the former *तुँसाव* is contracted to *तोव*; the later *तुँबा* to *तो*. And so forth; the pronouns offer many more illustrations.

*Note 5.*—The Marāṭhi *गळू* *boil*, might be also derived from the Sanskrit *गळ*; which might be preferable, as the Skr. *गळ* means *boil*, while *गळु* does not exactly. In illustration of the change of the Skr. *ख* to *ह*, I may quote the word *कुषाखी* which according to Śubha Chandrá sūtra II, 80. changes in Prākṛit to *कोखडी* or *कोखही*. If this derivation be correct, then *गळू* is another example of the change of the termination *अक* to *उक*; for its proximate original will, then, be *गळुकं*. I may here add a few more examples of the change of the termination *अक* to *इक* or *उक* in Prākṛit which have occurred to me since writing the foregoing essay. They have not always been recognized as such by Prākṛit grammarians. E. g., in Śubha Chandra sūtra *अवहादो* वा (II, 8. corresp. to Hema Chandra I, 44), it is said among the examples that *पावाह* is a modification of the Sanskrit *प्रवाही*; and again in his sūtra *उर्दिनि प्रवाही* (II, 53. corresponding to Hema Chandra I, 94, 95) it is said that by the change of *इ* to *उ* the Sanskrit *प्रवाही* becomes in Prākṛit *पवाहो*. It is manifest, that the Prākṛit *पवाहो* or contracted *पवाह* (or *पावाह*) is not a modification of the Sanskrit *प्रवाही* (of the base *प्रवासिन्*) but of a Sanskrit form *प्रवासक*: Again Śubha Chandra has a sūtra *वारनयति* (II, 20, corresponding to Hema Chandra I, 50), according to which the vowel *अ* of the affix *नय* optionally changes to *अइ*; the example given is *अवमरयो* for Sanskrit *अमनय*; that is, according to the Prākṛit grammarian's theory the Skr. *अमनय* changes to *अवमरयो* or, with elision of the medial *व*, *अममरयो*. This is evidently a fanciful theory. The truth, no doubt, is that the Sanskrit base *अमनय* is, by adding the affix *क*, amplified to *अमनयक* and then weakened to *अमनयिक*; the latter form naturally yields the Prākṛit form *अममरयो* (by eliding *य* and *क्*). Again Śubha Chandra has a sūtra *सर्वज्ञादीनामेव* (II, 18, corresp. to Hema Chandra I, 57), according to which, if the comp. cons. *ज्ञ* is changed to *च*, the inherent vowel *अ* becomes *उ*; thus Skr. *सर्वज्ञ* becomes in Prākṛit *सर्वचू*. Now the form *सर्वच* presupposes an original base *सर्वेज्*, but there is no such base in Skr.;

but *सर्वज्ञ* would be naturally amplified to *सर्वज्ञः*, and this might very well be modified to *सर्वज्ञक*, which would yield a Prākṛit form *सर्वज्ञुषो* or contracted *सर्वज्ञु*. It should be noted, that all the words referred to here, are such in which the forms in *इक* and *उक* are confined to the Prākṛit, while in Sanskrit they occur only in the form in *अक*. But there is a not inconsiderable number of Sanskrit nouns in *अक* (i. e. *अ* + affix *क*) which have, in Sanskrit itself, alternative and equivalent forms in *इक* and *उक*. Now considering that most of these forms in *इक* and *उक* occur only rarely and in late Sanskrit works, I think we are justified in concluding that, a., they are merely phonetic modifications of the original form in *अक* (i. e., not formed by a separate and original Skr. affix *इक* or *उक*, which is the common opinion); b., that originally they were peculiar to Prākṛit, having originated by Prākṛit phonetic law; and c., that they have been retransferred from Prākṛit into Sanskrit (a theory regarding the relation of Prākṛit and Sanskrit which admits perhaps of wider application, than is generally thought). If this view be correct, the number of those cases where a Skr. base in *अक* has undergone in Prākṛit a modification into *इक* or *उक*, will be very much enlarged. As to the prevalence of the addition of the affix *क* (resp. *इक*) in Prākṛit, see the testimony of Dr. J. Muir in Sanskrit Texts Vol. II, p. 122, and Dr. Weber in *Fragment der Bhagavatī*, I. ster Theil, pp. 437, 438.

*Note 6.*—The Gaurian verb, *पीना to drink*, must be derived from the reduplicated root *पिब* (for *पि*), which, probably, was much more extensively employed in colloquial Prākṛit than either in Skr. or literary Prāk. The Prāk. Gerund of *पिब* would be *पिबद्दीचं* or *पिबद्दिचं*, or (with elision of *च*) *पिबद्दिचं*, or with insertion of euphonic *च* (espec. mentioned by Hema Chandra I, 180, Śubha Chandra III, 5), *पिबद्दिचं*, or (broadened) *पिबद्दिचं*. This latter form would be contracted in Gaurian regularly to *पीनचं* (old G.), *पीने* M., *पीनो* B., *पीना* H.

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*Note.*—I withdraw, for the present, the remarks on the Skr. Past Part. Act. affix *इतवान्* on page 67.

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The following errata, chiefly broken vowel points, occur in the first three essays published in the Journal for 1872.

| Page | line | 5, for | स            | read | से        |
|------|------|--------|--------------|------|-----------|
| "    | 125, | "      | 11, " स      | "    | से        |
| "    | 126, | "      | 12, " सै     | "    | सै        |
| "    | 127, | "      | 35, " स      | "    | से        |
| "    | 127, | "      | 38, " कर     | "    | केर       |
| "    | 128, | "      | 2, " केरा    | "    | केरो      |
| "    | 131, | "      | 35, " केस    | "    | केसे      |
| "    | 133, | "      | 14, " छता    | "    | छतो       |
| "    | 133, | "      | 15, " निचय   | "    | निचयः     |
| "    | 135, | "      | 20, " कद     | "    | कदे       |
| "    | 135, | "      | 21, " करक    | "    | केरके     |
| "    | 136, | "      | 13, " केरक   | "    | केरके     |
| "    | 138, | "      | 14, " तेर    | "    | तेरो      |
| "    | 138, | "      | 15, " खाना   | "    | खाना      |
| "    | 138, | "      | 27, " भ      | "    | सभ        |
| "    | 141, | "      | 6, " Kabír   | "    | Kabír and |
| "    | 141, | "      | 16, " भष     | "    | भेष       |
| "    | 142, | "      | 35, " करक    | "    | केरक      |
| "    | 145, | "      | 13, " घोड़ा  | "    | घोड़ा     |
| "    | 145, | "      | 34, " घोड़ा  | "    | घोड़ा     |
| "    | 145, | "      | 34, " घोड़   | "    | घोड़े     |
| "    | 146, | "      | 1, " कुरा    | "    | कुरो      |
| "    | 146, | "      | 7, " धंधा    | "    | धंधो      |
| "    | 146, | "      | 7, " ना      | "    | नो        |
| "    | 146, | "      | 9, " ना      | "    | नो        |
| "    | 146, | "      | 10, " ना     | "    | नो        |
| "    | 146, | "      | 11, " ना     | "    | नो        |
| "    | 146, | "      | 19, " ना     | "    | नो        |
| "    | 146, | "      | 20, " ना     | "    | नो        |
| "    | 147, | "      | 1, " काह     | "    | कोह       |
| "    | 147, | "      | 41, " करदीयं | "    | करदीय     |
| "    | 142, | "      | 14, " जा     | "    | जो        |
| "    | 149, | "      | 14, " ना     | "    | नो        |
| "    | 149, | "      | 16, " कादा   | "    | कदो       |
| "    | 151, | "      | 7, " लड      | "    | लाड       |
| "    | 151, | "      | 8, " लरो     | "    | लारो      |
| "    | 151, | "      | 8, " लभः     | "    | लामः      |

|           |            |     |        |        |
|-----------|------------|-----|--------|--------|
| Page 152, | line 8,    | for | सुनायो | सुनायो |
| " 152,    | " 12,      | "   | पाव    | पावे   |
| " 155,    | " 18,      | "   | सम     | समे    |
| " 152,    | " 18,      | "   | सम     | समे    |
| " 152,    | " 19,      | "   | सनेउ   | सनेउ   |
| " 153,    | " 30,      | "   | सनेहो  | सनेहो  |
| " 153,    | " 31,      | "   | सनेहो  | सनेहो  |
| " 153,    | " 35,      | "   | सनेउ   | सनेउ   |
| " 154,    | " 5, 7, 9, | "   | भनर    | भनर    |
| " 153,    | " 35,      | "   | साला   | सोला   |
| " 154,    | " 25,      | "   | सा     | सो     |
| " 154,    | " 28,      | "   | सना    | सना    |
| " 155,    | " 4,       | "   | सनेहो  | सनेहो  |
| " 155,    | " 12,      | "   | सा     | सो     |
| " 155,    | " 20,      | "   | साहा   | साहा   |
| " 159,    | " 1,       | "   | साप    | साप    |
| " 159,    | " 1,       | "   | विष    | विष    |
| " 162,    | " 33,      | "   | for    | or     |
| " 163,    | " 28,      | "   | कर     | कर     |
| " 164,    | " 42,      | "   | हाड    | हाड    |
| " 165,    | " 2,       | "   | हाडया  | हाडया  |
| " 165,    | " 2,       | "   | हाडक   | हाडक   |
| " 165,    | " 3,       | "   | हाडरर  | हाडरर  |
| " 166,    | " 1,       | "   | कपिप   | कपिप   |
| " 166,    | " 6,       | "   | कर     | कर     |
| " 170,    | " 1,       | "   | सा     | सो     |
| " 170,    | " 1,       | "   | सा     | सो     |
| " 170,    | " 35,      | "   | सही    | सही    |
| " 171,    | " 23,      | "   | व      | व      |
| " 173,    | " 7,       | "   | साप    | साप    |
| " 173,    | " 9,       | "   | विष    | विष    |
| " 173,    | " 18,      | "   | साम    | साम    |
| " 173,    | " 23,      | "   | सहा    | सहा    |
| " 173,    | " 23,      | "   | सा     | सो     |
| " 173,    | " 33,      | "   | सोही   | सोही   |
| " 164,    | " 4,       | "   | सा     | सो     |

# JOURNAL OF THE ASIATIC SOCIETY.

Part I.—HISTORY, LITERATURE, &c.

No. II.—1873.

*Note on two Coins from Kausambhi.*—By THE HONORABLE E. C. BAXLEY,  
C. S. I., C. S.

The two coins which I lay before the Society, come from the site of the ancient city of Kausambhi, situate on the river Jamuná, near Alláhábád, a full description of which will be found in Genl. Cunningham's work on the Geography of Ancient India, Vol. I, pp. 391-98, as also in his Archaeological Reports from 1862 to 1865, Vol. I, p. 301.

Bábu Sivaprasád, C. S. I., the Inspector of Schools for the Banáras Division, to whom General Cunningham acknowledges his obligations for information regarding this site, some time ago sent me several coins found upon it. I told him, that though evidently containing types of much interest, they were unfortunately too imperfect for identification, but that I had no doubt, more perfect coins would yield a valuable result.

Bábu Sivaprasád has now sent me the two present coins with a few others of less interest, one of the latter is of the type which Col. Stacy termed the "Cock and Bull" type, and bears the legend 'Deva mita (sa ?)'. This coin, however, is not from Kausambhi, but from Eastern Audh.

The first of the two coins which I am about to describe (Fig. i), is rather thin, weighing 37·035 grains, and is of a white metal which does not appear to be silver, but which I have not ventured to clean. The reverse bears a rude and faint representation of some animal, apparently the Indian bull. The obverse bears, in the field of the coin, the symbols of the sacred tree on the left; in the middle a curious semicircular disk, with a sort of handle and some marks within the semicircle, more like a spade or similar agricultural instrument than anything else to which I can compare it.

The symbol on the right appears to be identical with one often found on the early punched silver coins so common in India, and resembles the rod of Asculapius, or rather perhaps two serpents entwined across a staff.



The legend, however, is the most remarkable part of the coin. It is quite legible, and I read it as महावरुण, or "Maha Varuṇḍa," the last letter being a compound (as I take it) of the cerebral  $n = ण = न$  and the cerebral  $व = व = द$ . The last letter may, however, be possibly वु, in which case the word would read "varuṇḍú." In either case, the word would be "varuṇḍa," Prakrit for Vāruṇḍa, for which no other meaning is given in the dictionaries, but that of "king of the serpents," of whom it was either the name or title. I am indebted to Rājā Kālikrishna for the etymology of the word, which he derives from the root वृ (वृणाति), "to nourish or support," or as in some lexicons, "to protect, to surround,"—a root from which is said also to be derived the word 'varanda' or 'veranda' in such common use among us.

The conclusions I would draw from the use of this term are as follows,—whether it was used as the name of the striker of the coin, as such names Balarām, Mahārām, Mahādeo, Srikishn, are used in our own day, or as an invocation to the deity worshipped; in any case the use of the acknowledged name or title of the serpent king indicates the prevalence of snake worship at Kausambhi at a period which, from the character of the letters, I should be inclined to place at least one century before the Christian era, possibly much earlier.

The next coin (Fig. ii) is even yet more curious. It is of copper and thicker than one above. The weight is 60.444 grs. The reverse also apparently bears the figure of an animal, now undistinguishable; the obverse, however, is unusually clear and distinct, and from the form of the letters, I would give it a more recent date than the previous coin, but still place it not later than the first century of the Christian era.

The symbol to the left Bábu Pratápachandra Ghosh assures me is the true "svastika," that which is ordinarily so called, and which is identical with the "fylfot" or Odin's seal being properly termed Vajráṅkus'a.

The centre symbol is the sacred tree, and the third to the right a serpent. The legend runs plainly thus—

ठहजतमित  
thaha jata mita

I have consulted Bábus Rajendralala Mitra, Pratápachandra Ghosh, and Sivaprasád as to the reading of this somewhat obscure compound. Admitting that "tha" might be taken as the equivalent of "tha," and that again as the Prakrit representation of "stha," Babu Rajendralala nevertheless prefers to read the legend as written, and I am disposed to agree with him so far. He would take the syllable "tha" as representing the little used word "tha," ठ, an idol, "ha," ह, to break, and, jata, जन for जित, conquering or conqueror, with of course "mita" मित्र, for मित्र, and would read the whole as "the friend of the conqueror of the idol breaker, or the 'idol breaker conquering friend,' the latter construction being one used not uncommonly at the period which I have above assigned to this coin. Babu Pratápachandra Ghosh would prefer to read "stha" for "tha," and the second letter as "pa," thus making the two first syllables "stha pa," for sthá pa, which, taking "stha" in the secondary of the world, would of course enable them to be rendered as "protector of the world," but the second letter is, I think, too plainly "ha," so that the reading of "pa" is not admissible.

Bibu Sivaprasád prefers reading "jata" as "jatr," born, quoting the parallel name of "Ajitasatru," a suggestion which may be well worth considering, the entire thus read might be translated as "friend of him who was born an iconoclast." Without expressing any preference for these readings, which I give only as suggestions, I leave the further discussion of this very interesting coin to Sanskrit scholars.

Accepting, however, as is, I think, almost unavoidable, Rajendralala's version of the two first syllables, the question naturally arises as to who "the iconoclast" is, to whom they point. Genl Cunningham considers that the earlier Buddhists admitted the use of at most only symbols of the deity, and rejected all representations or worship of Buddha personally. If that be so, the "idol breaker" might well be one of the earlier Buddhist rulers or missionaries. In any case the term is curious as pointing thus early to a struggle against idolatrous worship.

In the next place it seems to me that this curious and somewhat ponderous combination of terms can hardly have been the actual *name* of any individual, but that it was more probably an assumed title, or synonym, perhaps that of some municipal functionary of Kausambhi. Babu Rajendralala has suggested as accounting for the use of the curious word ठ, that it might have been employed under a custom by which the first letter of a Hindu name is often that of the asterism under which he is born, and as ह is the letter for Leo, the name might indicate the birth of its bearer under that asterism. If, however, it was an *official* title, this suggestion



would not apply, unless, indeed, it might perhaps similarly indicate the commencement of office under that asterism.

Any way, the coins are both very suggestive contributions to the little-known early history of India, and Bábu Sivaprasád deserves the thanks of the Society for bringing them to light.

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Rude Stone Monuments in Chutiá Nágpúr and other places.—
By COL. E. T. DALTON, C. S. I., *Commissioner of Chutiá Nágpúr.*
(With three plates.)

A passage in the address of our President published in the Proceedings for February last, reminds me that I should no longer delay in laying before the Society some extracts from my journal describing rude stone monuments in Chutiá Nágpúr. We have here the advantage of possessing both ancient and modern monuments of this type, we may find them crusted with lichens of time and belonging to a generation of whom no tradition even remains, or we may find them still moist with the tears of the mourner!

In my work on Descriptive Ethnology, I have given all the information which I possessed regarding the ceremonies and solemnities adopted by the Kolarian tribes in the disposal of their dead, but in regard to their monuments, their dolmens and monoliths, there is much more to say, especially since, after reading Fergusson's deeply interesting work on the subject, I find that so little is apparently on record regarding the rude stone monuments of Bengal.

In the cold weather of 1871, my work took me through some of the wildest parts of the Singbhúm District, and I saw many good specimens of the sepulchral and monumental stones of the Larka Kols or Hos. The former are in the village sometimes in one place or burial ground under the finest and oldest of the village trees, but sometimes the principal families have each their own collection near their houses.

The sepulchral stones consist of huge slabs covering the spot or spots where the ashes repose in earthen urns, raised a few inches from the ground by smaller stones used as pillars. In the village of Borkela, eight miles south of Chaibásá, I noticed a burial slab placed over the ashes of the grandfather of Sikur, the present deputy Manki of the Pir. Its dimensions were as follows: length, 16 feet; breadth 7 feet; and 1 foot 3 inches thick. Another over Turam, the grandfather of the Manki, length, 16 feet; breadth 7½ feet; thickness, 1 foot. This stone, an enormous slate, was carried from its site three quarters of a mile from the village, and the people devoted two months to the work, moving it inch by inch on rollers, when men could be collected for the purpose.

It is not surprising that they should take all this trouble for a man in the position of the Borkela Manki who is a chief of considerable influence and old family; but at the next halting place, Sargam Hato ('the village of the Sál'Tree'), I saw a huge stone which had been brought to the village in anticipation of the death of an old woman who was in the last stage of decrepitude. This old crone was not a pleasing object to gaze upon, and she had been for many years a burden to her family, but she had been kindly cared for, and had the gratification of knowing that a public funeral had been decreed to her, and the satisfaction of gazing on the monumental stone which had already been prepared to commemorate her virtues.

The Saranda Pir is a mass of hills forming the southern geographical division of the District of Singbhúm, and has a population, chiefly Kols, of about 700 souls. I entered the northern portion of this wild, unfrequented tract on the 1st January, 1872, and passing through it from end to end, emerged in Bonai on the 7th.

The villages of Saranda are few and far between, and the scanty population of the Munda type of Kols are in a very primitive state having no intercourse with the world beyond their own valley. In marching through the Pir to Bonai, the road continued up the valley watered by the Koina, which we traced almost to its source, and the small villages were for the most part on or near its banks. The sites were picturesque enough, and we generally found for our bath, pools shaded and rock-bound, in which Diana and her nymphs might have disported themselves. The people were at first rather shy. Many of them had never before seen a white face, but they gained confidence as we quietly advanced, and no evil fell on them in consequence of our intrusion. On one occasion, the women of a village which we passed were induced to follow us to camp, and there they sang and danced for us. Most of the men were away clearing the road; but those we saw, and the girls, in number twenty-five, who danced for us, were of strikingly fine physique, and there was very little drapery to hide their grand proportions. The predominance of eyes, nose, and mouth of the Mongolian type was very remarkable; some of them were of very light and bright colour, one of the group from her features and complexion might have been taken for a Chinese girl. Such traits stereotyped in Saranda, seem to indicate that these Mundas have been there from a very remote antiquity without opportunities of miscegenation. Some of the young women told me they had never ventured to cross the borders of their Pir.

After the dance we remained on very good terms with the fair sex in Saranda. The young women joined the men in clearing our path through the forest, and the vigour with which they used their felling axes, the hearty, good humour with which they toiled at the work, greatly astonished and edified our comparatively indolent and apathetic camp followers.

There are no ruins in Saranda, no indications of its having ever been even partially inhabited by people of civilization superior to those who are now there. The Saranda Garh (*i. e.* fort) shewn in the map is a mere earthen wall and moat constructed round the site of a house, formerly occupied by a family who are said to have held the position of chiefs of Saranda. Within this enclosure, there is a wonderful iron kettle-drum of gigantic size. It lies bottom upwards half buried in the earth. The people of the place could not be induced to go near it, except as postulants in an attitude of prayer! The tradition is that when the chief wished to summon his people, the drum was conveyed to the summit of the highest hill, and it could thence be heard in every village in the Pir.

I give these extracts from my journal to shew that in the Saranda Kols we find a very primitive type of the race. They are, by their own account, the true autochtones of the country, and till recently, no one has ever attempted to intrude on their exclusive occupation of this mass of hills. They repudiate all traditions of migrations which neighbouring cognates accept. The country they occupy was made for them and they for the country, and how long have they been here?

The oldest looking village that I saw, was called Rongso, where my tents were pitched under some grand old tamarind trees of immense age. Close adjoining, two noble Banyan trees stretch out their long arms and great hands over a vast area of massive slabs, which cover the ashes of past generations of the villagers. The small huts in which the living dwell, are miserable structures, but the dead lie in the most solemn and impressive burial ground that I have ever beheld. I have seen no finer Banyan trees than those which here form not only the canopy of the mausoleum, but grow columns and arches separating the whole into compartments, which fill the mind with a vision or dream of aisles, transepts, and crypts,—an old abbey of the Elves or Dryads. The site, it is said, was originally taken up by one family. There are now fifteen houses and about 75 inhabitants. The deaths are at the rate of about two per cent. per annum. All who die do not attain to the dignity of a slab, and the ashes of several members of a family may be deposited under one stone; for this is the custom of the Mundas, and I found the Saranda people more Munda than Ho, that is, in customs resembling more the Kols of Chutiá Nágpur proper, than the Singbhúm members of the family. The slabs above ground considerably exceeded 300 in number, but there were more buried or nearly buried. We may assume 400 slabs, and if we give only two to a slab and make allowance for the increase which starting with one family there must have been in numbers, we have proof of great age in what we see.

But this is a pigmy burial-ground in comparison to some which I subsequently visited.

I am indebted to Mr. T. F. Peppé for having directed my attention to the great Munda burial ground of Chokahatu ('the place of mourning'), and for the photograph of this very interesting scene, which I am sending with this paper.

This village is situated between Bundú and Buranda with Tamár to the south. These are all estates in the Lohardagga District, or it would be better to say in Chutiá Nágpúr proper, called now, with two others, Páñch (five) Parganah. The majority of the population and oldest people are Mundas, and the chiefs, who are usually called Rájás, are unquestionably Mundas too, though they are now thoroughly Hinduised, and call themselves Rájputs and Kshatriyas. There is a burial ground at Bundú, which merits attention, as a section of an understratum of graves, buried by time, is shewn where the soil has been cut away by water, and the cinerary urns are exposed, but the account of one will suffice.

The road from Bundú to Chokahatu goes east through a highly cultivated country. It crosses the Kanohi River, and on the right bank of that stream, I came unexpectedly on some very old looking ruins of stone temples, eight in number, apparently dedicated to Siva, as I noticed several lingas about, the only visible objects of worship.

The temples were mere shrines built of cut stones, squared and put together without any cement or clamps. No one in the neighbourhood has the faintest notion by whom, or at what period, these shrines were constructed. A quarter of a mile east of the ruins, I found a *deserted* Kol burial-ground, close to the village of Dáruharu, but the people of Dáruharu dare not use the old burial-ground; the descendants of those whose ashes lie there are gone out of sight and memory. And the Dáruharu people's remains must be taken to a spot two miles distant from their houses! Now I noticed that in this deserted burial-ground a very free use had been made of the stones cut for the temples, the slabs rested on such cut stones, so the deserted burial-ground was in use when the temple was in ruins, but all around have now passed away from the recollection of man, both those who worshipped the Sivas of the shrines, and those of another dispensation who helped to destroy them.

It was past noon when we came in sight of the great Chokahatu* burial-ground. It was then between us and the village of the name, the centre of a great plain, an anomalous interruption to a huge expanse of terraced cultivation. There are no great trees here to shade the graves, the field of mourning has no such solace.

The march had been a long one, and there was no time to lose, as I could not afford a halt, so I set all my clerks at once to work to count the slabs, and to measure the area of the space which they covered. The result gave.

* Lat. 23° 10', North; Long. 85° 56', East.

seven thousand three hundred and sixty tombs, mostly of the dolmen or cromlech form; almost covering an area of 22 bighas and 16 kattas, more than seven statute acres, and so close together, that you might traverse the ground in different directions stepping from grave to grave.

Many of the slabs appeared level with, some even below, the surface. Their sunken condition proclaimed their age, as we may presume that originally they were like the others above ground, supported on vertical stones. The horizontal slabs are many of them, huge masses of gneiss of various irregular forms. One, 15 feet 3 inches in length, by 4 feet 6 inches in breadth, was supported on five square pillars, 18 inches above ground; one half-buried slab, nearly elliptical in form, measured 12 feet 9 inches by 9 feet 10 inches; one nearly circular, like a table, 33 feet in circumference; another 18 feet in length had seven legs. A triangular slab properly appeared as a tripod, and one 13 feet 4 inches by 6 feet 8 inches had six legs.

I do not know that I have given the dimensions of the largest; there were many that appeared at least as large as those I measured.

There is no question as to the object of these raised slabs. Chokahatu, the 'place of mourning,' is still used by the Mundas of the village so-called, and nine of the surrounding villages, for the interment of their cinerary urns, and I believe one need not be long there to witness the ceremony. Many of the cromlechs appeared to have been freshly set up, many had about them a look of hoary age.

I obtained a list of villages which have places allotted to them in the burial-ground, and from the census returns, these villages contain nearly two thousand Mundas who by their faith, if they preserve it, *must* there deposit their cinerary urns. The mortuary statistics of the selected areas of the Lohardagga District give an annual average death-rate of under 20 per mille. If the population and the death-rate were always the same, and every cromlech covered the ashes of only one person, the number of slabs (which we may assume to be 8000, including buried and broken up graves not counted) would represent a period of only 200 years; but if, as with the Kasias, each cromlech is a family vault, and we allow for increase of population as years advanced, and make corresponding deduction in the number of deaths annually, as we count back we might give 1000 to 2000 years as the age of the oldest now existing, and probably excavation would disclose an understratum of similar graves.

I was told on the spot that some of the slabs were known to cover the ashes of several members of a family, but the ashes of one or two great men reposed in solitude. In Singbhúm, the latter custom is prevalent; but amongst the Mundas of Lohardagga, the family grouping of ashes is practised.

It is, of course, hard to say what changes may have taken place, likely

to affect the numbers of the Munda people in this part of the country, but there is no reason for supposing that there has been any considerable reduction by emigration. All Mundas who make use of the Chokahatu cemetery, must, in accordance with the creed of the race, be the descendants of colonists who established themselves at Chokahatu or somewhere near it. The founders of the other villages must be offshoots from the first settlement; the probability, consequently, is, that the Munda population of this neighbourhood has greatly increased.

The monumental stones in this part of the Munda country are few in comparison with the sepulchral; but many are noticeable, some in the villages, even within the garden enclosures (as they are always placed by people of the Kharriah tribe), some scattered in the fields as if placed there for the benefit of the cattle, like those whose founder Scotchmen are said to bless, and some in groups. The arrangement of the group is in line, perhaps indicating a line of ancestors or a family. They frequently served for a father, mother, and their offspring; but I do not find that more than one monumental pillar is ever set up in honor of one person. The turban seen occasionally on the central and tallest of a line of such monuments in the Kasia Hills, I have never perceived amongst the Kols; but though I have not myself seen carved pillars erected by Mundas to the memory of the dead,* I have heard of them.

It appears from Yule's account† of the Kasia cenotaphs, that cromlechs are sometimes found in front of them, a flat stone resting on short rough pillars which form the ordinary road side resting place of the weary traveller. These are not cineraries. I have stated in my 'Ethnology' that the Singbhúm Kols, when they first set up a monument, make round it a plinth of earth, on which the ghost of the departed or other person who is bold enough to take the seat may rest, but I have recently seen both in the Lohardagga and Singbhúm districts.

Monumental monoliths with little cromlechs in front, ghost seats, resembling exactly the Kasia seats, depicted and described by Colonel Yule, I first saw in Sonapet, a beautiful valley, the hills forming which give birth to the Sona River, an auriferous stream, hence the name. This valley has been held for ages exclusively by Mundas. Each village is a parish with its separate burial-ground and head man, and at the entrance of one of these, the village of Súrsi, I saw a fine monument of this description, raised to the memory of a respectable inhabitant recently demised. The Hargari, or cemetery, was at the other side of the village, and his grave was there shewn to me. So there could be no doubt that the seat was not, as I

* Mr. T. F. Peppé has kindly favoured me with a sketch of such carved pillars which I forward.

† Journal, As. Society, Bengal, No. CLII, 1864.

had at first supposed, the cinerary. The pen and ink sketches herewith sent are of similar monuments in and near the village of Regadih in Kursaon.

As the monolithic monuments throughout the Kol country, nominally, bear no proportion to the cromlechs, we must infer that the erection of the former in the name of the deceased is a much greater and rarer honor than the construction of the latter. In Singbhúm, the Mundas and Mankis are even now ruminating on the expediency of cutting on the pillar at least a name and date to shew to posterity in whose honor it was set up and when; for they admit that the object is not attained under the present system, as the name does not survive to a third or fourth generation.

The same remark applies to many pillars which have been set up to commemorate some solemn compact or action of importance, of which the stone itself now tells nothing. The art of making the stone tell its own story must be taught at the Chaibásá Industrial School.

In some parts of the country, suitable stones are not readily procurable. The first alternative is a cairn, a heap of stones usually constructed round a post, the second the post alone; but the top of the post, if set up in honor of some deceased friend or hero, is credibly carved into the representation of some animal. It looks like a cross between a camel-leopard and a horse. It is, I believe, the Bir Sádóm of the Kols, the jungle horse, the Nílgaí, *Antelope picta*.

It is obvious that a people thus addicted to the use of these milestones of ages, (without figures unfortunately) must have left traces of themselves in all places which they have successively occupied; and from all I have heard and read and also from what I have seen, I am of opinion that such traces of Kolarian occupation may be found wherever the cognates of the Mundas of Chutiá Nágpúr have been located.

There are traditions of the pre-Aryan Kol occupation of the Bihár and Gayá districts, and Mr. T. F. Peppé, Sub-Deputy Agent, who takes great interest in these questions, has seen the monolithic monuments in Japla, and Balaunja, in Siris Kútumba, in the wilder parts of the Gayá district, and about Shergháfi. We thus have them up to the Son River and in the Gangetic provinces. Mr. Peppé's note to me on the subject is appended.

From the western parts of the Mánbhúm district, the Kúrmis, it is said, expelled the Kols. We have good proof of this in the fact that the Kurmis are now there in possession, and within their boundaries we find the sites of the old Munda villages clearly indicated by their old cemeteries and occasional monolithic monuments.

In a southerly direction, I have found these Munda footprints as far as the confines of the Sambhalpúr district, and indeed in that district, and in Bámrá.

In all the places above mentioned, we have either the Mundas *in situ*, or traditions of their occupation and the stone monuments to attest the tradi-

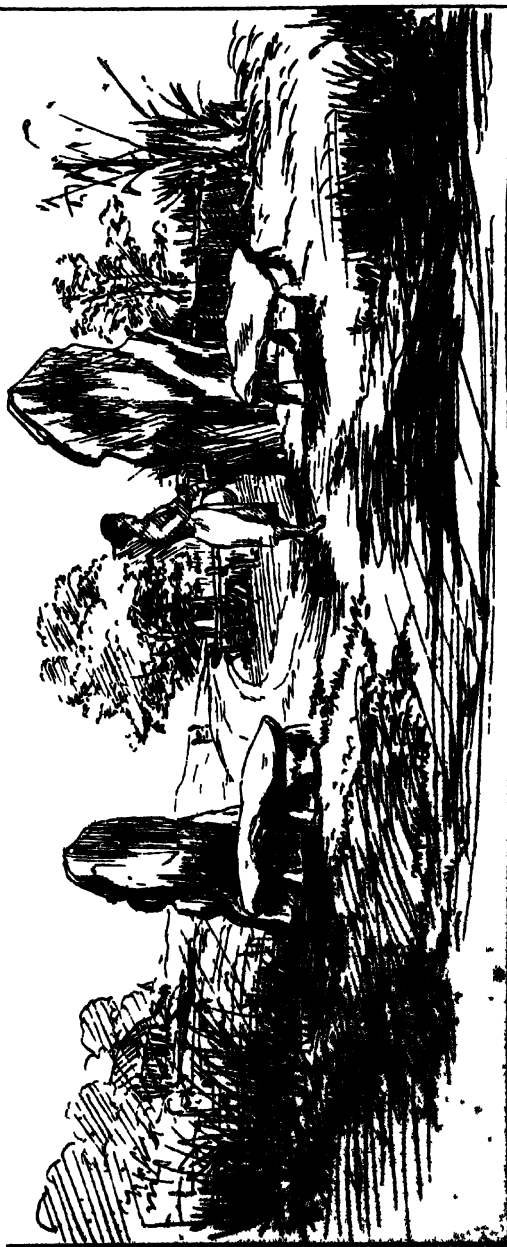


Illustration of the Surveyor General's Office, Calcutta.

REGAL MONUMENTAL STONES WITH GHOST'S SEATS

Sketch by Col. H. T. Dalton, C.B., I.C.

tion; where we find the latter without the traditions or the people, we may still safely infer that we have got on Munda tracks.

Note by Mr. T. F. Peppé.

'I have observed the monumental stones all along the boundary between Bihár and Chutiá Nágpúr, and have little doubt they would have been found in the more civilized portions of the Bihár and Patna districts, had not the custom been so common of erecting monumental stones in honor of deceased Hindús at the road sides leading into the village; and all sorts of stones are found set up in this way, many of them rude uncut stones, others parts of temples, and I feel sure many of them have been appropriated from their Kolarian predecessors.

'In the wilder parts of Bihár, in parganahs Japla, Balaunja, Sirris Kútumba and also in Shergháti, they are often to be met with, and their being found scattered over the country leaves little doubt of their Kolarian origin, to which local tradition assigns them.

'In several places, I have seen a singular kind of monumental stone in the Lohardagga district, and the accompanying sketch may give you some idea of those I have seen near Bajpúr, some few miles north of Nugri. They were claimed by the Pahan, or priest, of the village, who said that they had been set up in honor of his ancestors. I have seen them at other places also, but cannot remember where.

'With regard to Hargaris, or Harsaris, as they are sometimes called, I think it worth noting that the largest collections are found in the tract of country lying on both sides of the Subanrekhá, bounded on the west by the Chutiá Nágpúr Gháts, on the east by the Ajodia hill, on the south by the Singhbhúm hills, and on the north by the hills forming the boundary between Hazáribágh and Lohardagga and Mánbhúm. This tract includes the parganahs of Silli, Barunda, Rahi, Bundú, and Tamár on the west side of the Subanrekhá, and parganahs Julda, Bygonkudar, Bághmúri and Patkom on the other side. Judging by the vast collections of grave stones, this tract must have been occupied by a Munda population for a much longer time than any other portion of Chutiá Nágpúr I have seen. As you approach or recede from this centre, the collections of grave stones increase or diminish in number and importance, and it is curious to observe that, in the upper portion of the Damúdar valley, such indications of a Munda population are wanting, only monumental stones being met with.

'The largest slab I measured at Chokahatú, was 16 feet by 6½, by one foot in thickness, but at Barundah, about two miles to the north-west, there are some much larger.

* 'On remarking the comparative insignificance of the burial places on the plateau with those in the 'Lutur Desum' or low country, I have frequently been told in reply that it is only the Munda and his Bhúinháris who have slabs in the former, whereas down below every Munda family have their slab.'

The History of Pegu.—By Major General SIR ARTHUR P. PHAYRE,
K. C. S. I., C. B.

(Continued from p. 57.)

Rádzádirít was succeeded by his eldest son, Binya Dhammá Rádzá. His two younger brothers, Binya Ran and Binya Keng, who were governors of Dala and Takun (Rangoon), believing that he bore them illwill, entered into a mutual compact for their own protection. They came then to open war with the king; but Binya Ran made his peace, and was appointed crown prince. Binya Keng then wrote to the king of Ava, asking for assistance, and tendering his allegiance. The king of Ava at this time was Thihathu. He at once sent a force into Pegu, which occupied Dala, but gave great offence to Binya Keng by plundering the town. Binya Keng, disgusted with his allies, secretly made submission to his brother. Some of the principal Burmese officers were treacherously murdered; and a small remnant of the invading force was allowed to retire to Prome. Binya Keng was now forgiven, and was sent to Dala to put the defences in order. After some time Binya Ran, wishing to have the western provinces under himself, induced Binya Keng to move to Muttama, where he was appointed governor; while Binya Ran had Dala, Bassein, and Tharawati. The king remained at the capital with only nominal authority. The king of Ava at this time was Mengréthihathú, who ascended the throne in 784 (A. D., 1422). He determined again to invade Pegu, and sent down an army under two generals. Binya Ran decided to enter into an alliance with him, and offered his sister Tsáubomé in marriage. This was accepted, and the princess having first been consecrated as a queen, went to Ava. After this, the king of Pegu was poisoned by one of the queens, instigated, it is supposed, by Binya Ran. He reigned only three years.

The crown prince now succeeded, and is known as Binya Rankit. He allowed Binya Keng to be viceroy at Muttama, where he was almost independent. He enjoyed that power for eighteen years, and was then succeeded by his sister, who was married to an officer of high rank. This king, though he had some causes for dissatisfaction with the king of Ava, did not go to war. In the Burmese history it is stated that, about the year 799 (A. D., 1439), he interfered in the succession to the throne of Táungu, and placed thereon Mengtsán-ú, the son of a former king. This event is not mentioned in the history of Pegu. The rulers of Táungu, at this period, were anxious to be independent of Ava, and the fact is, no doubt, correctly stated. About this time the king's sister, who had been married to Mungthi-ha-thá, king of Ava, under the name of Tsáu-bo-mé, being dissatisfied with her position at that court, fled secretly with the assistance of two

Budhist monks, and came to Pegu. She was received by her brother with great distinction, and now becomes known in Peguan history as Thakheng, or Sheng-tsáu-bú.

When Monhyin Meng-ta-rá succeeded to the throne of Ava, the ruler of Táungú, Theng-kha-rá, declared himself independent, and claimed to be the rightful king of Ava. He entered into correspondence with Binya Rankit, proposing that they should march with their joint armies to take Prome, and promising, if he was successful in gaining the throne of Ava, to present annually gold and silver flowers in token of allegiance. This was agreed to, and a force of 35,000 men with five hundred elephants, under the command of Tha-min-pa-rán, and 30,000 men by the river under Binya-in, proceeded to Prome.

The king himself went by water; the king of Táungú marched his men across the mountains, and the allied armies then invested Prome. The king of Ava was too much occupied at home in securing his own position, to be able to send any succour to Prome. The governor of that city was, therefore, obliged to surrender it. But negotiations were opened, and Binya Rankit married a daughter of the king of Ava, and then appears to have deserted his ally. Ava and Pegu were now on good terms, but the historian is silent as to what was done with Prome. Pegu was prosperous in this king's reign, and he was much beloved. He repaired and adorned the two great national pagodas Shwé-máw-dau and Shwé-ta-kun. He died in the year 808, or A. D. 1446, after a reign of twenty years.

This king's successor was his nephew and adopted son, Binya Wa-ru, the son of Sheng-tsáu-bú by her first husband. He reigned only four years. He was careful as to the administration of justice; the country was quiet; and there was unrestricted commerce with the adjoining kingdom.

The next king was Binya Keng, a son of Binya Rankit. The Burmese history says that he was assisted to gain the throne by Narapati, king of Ava. He reigned only three years, and was succeeded by Mháu-dau, his cousin.

This King was a cruel tyrant, and put to death all the male members of the royal family whom he could lay hold of. The whole people, clergy and laity, joined against him, and five noblemen put him to death. He reigned only seven months. All the leading men of the country now implored queen Sheng-tsáu-bú, the daughter of Radzádirít, to take the sovereign power of the kingdom. She consented and was consecrated. All the people, Mun, Mrámmá and Kulá, rejoiced, and the country had rest. The queen received letters from the kings of surrounding countries, and beyond sea from Ceylon and Bij-ja-ná-ga-ran, with which there was much commerce. The queen was devoted to religion; religious buildings were repaired or erected; and the two great national pagodas were entirely re-gilded. Additional land was assigned to them, and five hundred families were dedi-

cated as slaves to the service of the Shwé Dagon, with a complete establishment of artificers and warders for service, day and night.* One of the Buddhist monks who had assisted the queen to leave Ava, was chosen by lot to become a layman; he was then raised to the rank of crown prince, with the title of Dhammá dzedi, and was married to the queen's daughter. Being suspicious that the other monk would, from envy, seek to raise a disturbance in the country, he had him put to death. After four years, the queen retired to Talkun, where she built a new palace, the site of which is still preserved by tradition. The crown prince remained at Hantháwati, where he carried on the duties of government, but once a month he came to pay his respects to the queen. Sheng-Tsáu-bú, after reigning three years at Ta-kun, died at the age of sixty-five years. Her name is held in high honour among the people to this day; and a national festival to her memory is celebrated once a year at Rangoon.

The crown prince Dhammá Dzedi was consecrated king. Some nobles were discontented as he had no hereditary right; but when they saw how well he ruled the country, they were reconciled to him. He is celebrated in the history of Pegu for his great wisdom. Numerous instances are given of the difficult questions which he solved, and the decisions he gave in various legal suits. Embassies came to him from China, Siam, Ava, Hau (?), and Ceylon. He was earnest in religion. He made no wars, but extended the boundary of his kingdom east of the Than-lwin, establishing the district of Mháing-lun-gyi. His subjects believed that he could make gold. He died after a prosperous reign of thirty-one years, in the year 853, or A. D. 1491. He received the funeral honours of a Tsekya-wati (Chakrawartti), or universal monarch, and a pagoda was built over his bones, which was crowned and gilded all over, as if it were an object of worship.

He was succeeded by his son Binya Ran, whose mother was the daughter of Sheng-tsáu-bú. During the long reign of this king, nothing is recorded as to intercourse with foreign countries, which had been so prominent in his father's time. He made a progress up the Eráwati at the head of a large army, which is called a pilgrimage to the Shwé-zí-gun pagoda at Pugán. When passing Prome, he was received with high honour by the ruler of that city, who appears then to have been an independent prince. At this time, the king of Ava had little power beyond his own city. In the Burmese history, it is stated that Binya Ran made an attack on a fort built by the king of Táungu, but this is not mentioned in the Peguan history. Binya Ran died in the year 888 (A. D. 1526), after a reign of thirty-five years.

* For many centuries the servitors and warders of pagodas in Burma have been slaves, that is, persons condemned to the occupation, or descendants of such persons. They are degraded outcasts among the general population. Joshua condemned the Gibeonites to similar occupation. See Book of Joshua, chapter ix. 27.

This king had appointed one of his younger sons to succeed him. This was done through the influence of the mother, but the child was put to death the day his father died, and another son, named Ta-ká-rwut-bi, who was fifteen years of age, ascended the throne. He paid no attention to the affairs of the kingdom, but passed his time in frivolous amusements with evil companions. He disregarded all warnings, and as many evil portents appeared, and even a flaming comet waved in the sky, the people dreaded some dire disaster. At this time Meng-ta-ra Shwé-hti, called Ta-beng Shwé-hti, was the king of Táungu, having succeeded his father in the year 892, when he was only sixteen years of age. Táungu, from being an insignificant state, had slowly risen to importance, and when Ava fell to a race of Shan kings, the rulers of Táungu gradually came to be considered the representatives of the ancient Burmese monarchy. Binya Ran, no doubt, had made an attack on Táungu which had been repelled. The young king, a warlike and ambitious prince, determined to avenge the insult. His first attack on Pegu was made in the year 896. It was unsuccessful, but for four successive years he led his armies against his enemy. At last in the year 900 (A. D. 1538), he mastered the capital Hantá-wati.* Takárwutbi is said in the Burmese history to have retired to Prome, where he was kindly received by the king; and it is added that the king of Ava, Tho-han-bwá brought a Shan army to his assistance. But Tabeng-Shwé-hti appeared with an army near Prome, and a battle was fought, chiefly by the flotillas on the Erawati, in which he was victorious. But he does not appear to have been strong enough to take Prome; for he retired down the river, and no action was taken to follow him. The unfortunate king of Pegu, unable to induce his allies to support him further, marched down with a small force, and lost his life in the jungle of his native country. In the Taláing history is stated that the king of Ava, who is referred to merely as a Shan Tsáu-bwá, came down to Pegu with an army to assist Takárwutbi, but as they could not agree to the term of an alliance, the former retreated without doing anything. The king of Pegu then died of sickness in the jungle of the district of Engabu. This was in the year 902 (A. D. 1540), and the Shan royal line of Pegu, which had been established by Wa-re-ru in A. D. 1287, became extinct. The new dynasty pursuing a reckless career of conquest, raised the kingdom to a height of dazzling, but false, prosperity, which excited the astonishment of European travellers. But in less than half a century, the country was utterly exhausted, and the population so reduced by war, pestilence, and famine, that to this day it has not recovered.

The narrative having reached thus far into the sixteenth century, when

* These destructive wars which ended in the conquest of Pegu by the king of Táungu, are described in the Burmese history. See *Journal, As. Soc. Bengal*, Vol. XXXVIII, for 1869.

European voyagers appeared in Burma and Pegu, it is desirable to relate what can be gathered regarding those countries from the narratives of travellers which have come down to us. They give, as might be expected, an insight into the condition of the people, which is not to be obtained from the native chronicles. Up to the beginning of the sixteenth century, European travellers had arrived in Indo-China, either by land, by sea from India, or after the Cape of Good Hope route was discovered, from Malacca. At that time there appears to have been no jealousy felt at their presence. That feeling was developed throughout Southern Asia by the conquests of the Portuguese, the Dutch, and the British, by which European dominion seemed, to the minds of the people, to loom like a dark cloud over their destiny.

After Marco Polo, who came into Burma from Yunan towards the close of the thirteenth century, the earliest traveller's narrative which has come down to us, is that of Nicolo Conti, a Venetian, whose travels have been edited by Mr. R. St. Major, for the Hakluyt Society. This traveller, leaving Europe on a trading expedition, arrived by land at Bussora, and sailing from the Persian Gulf reached Cambay. From thence he went to Ceylon and Sumatra, and sailed up the Malay coast to Ternasser, now Tenasserim. Passing then by Pegu, he went to Bengal entering the mouth of the river Ganges. Remaining some months in India, he returned southward, and sailing apparently from Chittagong, came to the city of Rachan (Rakháing, or in the modern Europeanized form, Arakan), and river of the same name.

From this city he travelled through "mountains void of all habitations, "for the space of seventeen days, and then through open plains for fifteen "days more, at the end of which time he arrived at a river larger than the "Ganges, which is called by the inhabitants 'Dava.' Having sailed up this "river for the space of a month, he arrived at a city more noble than all "the others, called Ava, and the circumference of which is fifteen miles."

It appears most probable from the narrative that Conti was at Ava about the year 1430, which would be in the reign of Monhyin Meng-ta-rá, the eighth in the list of kings who reigned in Ava. The river Dava, it has been suggested by Colonel Yule, was originally written "Fiume d' Ava," the name told to Conti for the Eráwati on first reaching that river, after having crossed the Yoma Mountains. The country of Upper Burma he calls 'Macinus,' derived from Maháchín, or Máchín, a name which Colonel Yule has shown to have been applied by Muhammadan voyagers both to China and Indo-China. Conti, no doubt, was in company with Indian traders from Bengal, from whom he would learn this name. In the *Áin Akbarí*, it is stated that former writers called Pegu 'Chín.' Conti describes very correctly two methods employed in Burma for catching wild elephants.

He mentions the habit of tattooing the body, and says that the women practise it as well as the men, which is not now the case. The king, he says, has ten thousand elephants, which he uses in his wars. "They fix castles on their backs, from which eight or ten men fight with javelins, bows, and those weapons which we call crossbows." The number ten thousand is, no doubt, an exaggeration, probably double the actual number. From Ava, Conti proceeded towards the sea, "and at the expiration of seventeen days he arrived at the mouth of a moderately sized river, where there is a port, called Xeythona, and having entered the river, at the end of ten days, he arrived at a very populous city, called Panconia, the circumference of which is twelve miles."

It is not said by what route Conti went from Ava, but apparently it was by land to Raméthen and Táungu. The port Xeythona may possibly be the town of Sittang, but that town being situated on the river of the same name some seventy or eighty miles from its mouth, and the river not being navigable from the sea, it can scarcely be called "a port." The name, therefore, is more probably meant for Tha-htun, which was an ancient and celebrated port, and was still to some extent frequented. It is now mentioned for the last time in the history of Pegu. The populous city of Panconia, a misprint probably for Pauconia, is no doubt Pegu, or, as Conti would have heard it called, Pa-go or Ba-go. The traveller makes no mention of any war between the kings of Ava and Pegu, and from A. D. 1426 for many years no such war is recorded in the native histories. Conti's narrative agrees well with the local histories, and from his notices of the people, the truth of his statements is evident, even when he mistakes some of the native customs. Thus he observes of the Burmese: "All worship idols; nevertheless, when they rise in the morning from their beds, they turn towards the east, and with their hands joined together say, 'God in Trinity and his law defend us.'" All pious Budhists in Burma, on first awaking in the morning, invoke or bless the three precious objects "Budha, his law, and his disciples;" but, of course, there is here no reference to God in Trinity.

The next traveller who claims our notice, is Athanasius Nitikin, a Russian, who came to India between 1428 and 1474. He mentions having gone from Ceylon to Shibait and Pegu. He merely observes of the latter—"It is no inconsiderable port, principally inhabited by Indian dervishes." He perhaps means that the principal merchants were Indians, as he says the products of the country were sold by the dervishes. Why he should style them *dervish* is not apparent, but probably most of the Muhammaḍan merchants assumed the title of Háji.

Hieronimo de Santa Stefano, a Genoese, came by the Red Sea to India, to the port of Calicut; thence to Ceylon and Coromandel, which latter

probably means a port on the Krishna or Godávarí. From Coromandel, the traveller came to Pegu, and records that he was detained there for a year and a half, and that his companion Hieronimo Adorno died on St. John's day, 1496. He was buried "in a certain ruined church, frequented by none," which refers no doubt to a deserted Buddhist kyaung, or monastery. Pegu he calls Lower India, and says of the capital:—"Here is a great lord who "possesses more than ten thousand elephants, and every year he breeds five "hundred of them. This country is fifteen days journey by land from another, "called Ava, in which grow rubies, and many other precious stones. Our "wish was to go to this place, but at that time, the two princes were at "war, so that no one was allowed to go from the one place to the other. "Thus we were compelled to sell the merchandize which we had in the city "of Pegu, which were of such a sort that only the lord of the city could "purchase them. * * * * The price amounted to two thousand "ducats, and as we wished to be paid, we were compelled, by reason of the "troubles and intrigues occasioned by the aforesaid war, to remain there a "year and a half, all which time we had daily to solicit at the house of the "said lord." At this time, 1496, Binya Ran was king of Pegu. It does not appear from the native histories that he had any direct war with the king of Ava, but he did attack Dwárawati, a fort belonging to Táungu about this very year 1496; and as the king of Ava affected to consider himself the superior of the king of Táungu, some expectation of hostilities may have existed. An expedition was made up the Eráwati a few years later, as we shall see presently. Though the traveller complains of the delay in payment being made for his merchandize, yet he appears to have been treated justly. The property of his deceased companion was seized as a forfeit to the king, such being the ancient law of Burma in the case of foreigners dying in the country. He says, "I was so grieved and afflicted by his death, that it was "a great chance I had not followed him, but * * * * being consoled "by some men of worth, I exerted myself to recover our property. In this "I succeeded, but with great trouble and expense."

The same king Binya Ran, who reigned from A. D. 1493 to 1526, appears from the account of another traveller, Lewes Vertomannus of Rome, to have been, as he expresses it, "of great magnificence and generosity." This traveller came to Pegu about the year 1503. In his narrative, as translated in Hakluyt, he states that he "came to Pego from Bengalla with "a Persian. The city is walled and the houses buylded and very fayre of "stone and lime. Here are but few elephants. There are exceeding great "reeds, as big as the body of a gross man, or a tub. The king useth not "such pomps and magnificence as doth the king of Calicut, but is of such "humanity and affability, that a child may come to his presence and speak "with him. It is in a manner incredible to speak of the rich jewels, pre-

"cious stones, pearls, and especially rubies which he weareth, surmounting in value any great city. Not long after, news were brought that the king of Ava was coming with a mighty force, whom the king with an innumerable army went to resist." This army probably was the force which Bin-ya Ran led up the Erawati to Prome, and then on to Pugán. This expedition may have been made to resist an anticipated attack, but in the Taláing history, it is represented, with some dubiousness, as a pilgrimage to the pagodas at those cities. When Vertomannus says, "here are not many elephants," he must mean in the city, for the great strength of Pegu consisted in elephants; or they may all have been gathered at a distance to accompany the army.

Early in the sixteenth century, we have notices of Pegu by Portuguese voyagers, who under Vasco de Gama had doubled the Cape of Good Hope. Their actions in Pegu are recorded in the history of "The Portuguese in India, by Manuel de Faria y Sousa, translated by Stevens into English, and printed at London in 1695." The Portuguese were established at Malacca under Albuquerque in 1510. In 1517, John de Sylvera went to Bengal with four sail. He was invited by the king of Arakan to his country, and he appears to have gone to Chatigam, then a port of that king's dominions. In 1519, it is recorded that Antony Correa, "concluded a treaty with the king of Pegu at Martavan, when peace was sworn to by both parties with solemn ceremonies. The metropolis of the kingdom is Bagao, corruptly called Pegu."

We have seen in the Taláing history that the last king of Pegu was Ta-ka-rwut-bi, who succeeded to the throne in 1526, and was conquered by the king of Táungu, styled Ta-beng Shwé-hti, the capital having surrendered in 1538. How a Portuguese force happened to be present on this occasion, but which is not noticed in the native histories, is thus stated by Sousa. "Ferdinand de Morales was sent by the Viceroy with a great galeon to trade at Pegu. Pegu was then invaded by the king of Brama. Brama had been tributary to Pegu, but had revolted. The cause of this was that 30,000 Bramas laboured in the king of Pegu's works. The king used to visit them, attended only by his women. They suddenly rose and murdered the king, and fled to their own country. Then Para Mandara, king of the Bramas, rose, recovered his own kingdom of Ava, and overrun the Laos and other countries tributary to Pegu. The king of Brama now invaded Pegu with such a power, that the two armies consisted of two millions of men with 10,000 elephants. Morales went into a galliot, and commanding the fleet of Pegu, made a great havock among the enemy's ships. Brama came on by land like a torrent, carrying all before him, and his fleet covering the river, though as great as the Ganges. With this power he easily gained the city, and the kingdom of Pegu. At the point Ginamaré-

"ca was a furious, bloody, and desperate fight. But the Pegus overpowered by the Bramas deserted Morales, who alone in his galliot maintained himself against the enemies, performing wonders with vast slaughter of them; but oppressed by the multitude, he was killed." Of the Peguans generally it is remarked that "their bodies are all wrought blue with hot iron down to their knees. In general, they are not only not civilized, but "very brutal."

In this account it should be observed that the Portuguese historian, writing more than a century after the events described, and probably from imperfect documents, in addition to evident exaggerations on points where the European actors in this tragedy might have furnished more accurate information, has been led to narrate supposed events, which caused or preceded the invasion of Pegu by "the king of Brama." These are in themselves highly improbable, and not to be found in the native histories. The king of Brama is, in fact, Meng-ta-rá, or Tabeng Shwé htí, king of Táungu, who, as has already been stated, had by a remarkable train of events come to represent the national party of Burma, against the Shan dynasties of Ava and Pegu. The term Pará Mandara (Phrá Mengta-rá) is a title equivalent to the king's Majesty. In the native histories no distinct cause is alleged for the invasion of Pegu by the king of Táungu; but the relations between the two monarchies, for about a century before, sufficiently account for the event. If "Brama" of Táungu had not been exactly tributary to Pegu, he had for several generations, when it was convenient, depended on the latter to support him in resisting Ava. By the Burmese history, the chief of Táungu, so early as the year 788 (A. D., 1426), had offered to become tributary to Binya Rankit, if he helped him to the throne of Ava, which the chief of Táungu claimed as his right. The two kings had entered into an alliance, and in 1481, the then king of Táungu, fearful of an attack from Ava, sent his wife and children for safety to Pegu. Afterwards, the two kings quarrelled in A. D. 1496, or thereabouts; the king of Pegu attacked Dwárawati, a fort and city belonging to Táungu, but the expedition was unsuccessful. Such an incident as Burmese prisoners or labourers when at work, being visited by a king of Pegu unaccompanied by male attendants, may be regarded as in the highest degree improbable. There is no trace of such an event or of the king's death under such circumstances in the Taláing or Burmese history. The last king of Pegu, of the Shan dynasty, who was dethroned by Tabeng Shwé htí, died, as we have seen, in the jungle, having no army, and the king of Ava having failed to give him further support. Some rumours of his having been assassinated in the jungle may have reached the Portuguese, and have given rise to the tale recorded. "Para Mandara, king of the Bramas" who conquered Pegu, was not the king who recovered his own "kingdom of Ava, and overran the Laos and other countries tribu-

tary to Pegu." Those conquests were accomplished many years after the conquest of Pegu, by the successor of Tabeng Shwé htí, who is generally styled Bureng Náung, and by the Portuguese historian 'Branginoco' and 'Chaumigrem.' Both of these kings are mentioned in the Taláing history with the title Meng-ta-rá (to which Phrá would be added in speaking of them); both invaded Siam, and both besieged Prome, so that the error which confused one with the other, is not to be wondered at.

It is doubtful whether Bureng Náung had any hereditary right to succeed Tabeng Shwé htí. His claim seems to have been his great military talent, and his marriage with the king's sister.

The following statement is taken from the Universal History, Vol. VI., published in London in 1781. It professes to derive its information regarding Pegu and the adjoining countries from Portuguese, Dutch, and English authorities. "In 1519, Antony Correa was sent to Bressagukan (Binya Ran), king of Pegu, to conclude a treaty. That king was slain, in 1539, "by some Barma labourers who were furnished by Para Mandara, king of "the Barmas. The cause of the rising is not stated. The king of Barma "now invaded the country, and Dacha Rupi, the heir to the deceased, was "unable to oppose him. At this time, Ferdinand de Morales arrived with "a great galleon, sent by the Viceroy of Goa to trade. He took the side "of Dacha Rupi, but they could not resist the overwhelming numbers of "the Barmas, and De Morales was slain. This occurred in 1539."

Here we have the names of the two last kings of Pegu, one considerably distorted, and it is Binya Ran who is here said to have been killed by the Burmese labourers in 1539. But that king as we have seen, died peaceably before the great troubles came in 1526. His son and successor Takárwutbi, whom we recognise in Dacha Rupi, died (or was killed) in the jungle in 1539 (or 1540, by the Taláing history), and this date with his flight and death in the jungle seems to give the clue to the origin of the story of the king killed by Burmese labourers.

Tabeng Shwé htí, having taken the city of Hantháwati, proceeded to lay siege to Muttama. This city, which lies to the south-west of the ancient capital, and at a travelling distance of nearly one hundred miles, was then governed by Tsau-bi-nya, brother-in-law of the conquered king, who had the rank of a Viceroy. The siege operations against Muttama, or Martaban, are related in detail in the Burmese Mahá Rádzáweng,* but the Taláing narrative is brief, and draws a veil over the final defeat of the Mun race. The besieging army numbered 180,000 men, with numerous vessels of every description. The whole was under the command of Bureng Náung, the king's brother-in-law, who is called by the Portuguese historian 'Branginoco.' Not a word is said in either of the native histories of Europeans being in the service of the

* See History of Burma race, Journal, As. Society of Bengal, Vol. XXXVIII, for 1869.

king of Pegu on this occasion, but it is mentioned that several ships were moored in the river opposite to Muttama, for the defence of the city, which were manned by Muhammadans, called on this occasion in the Burmese history 'Kulá-Pánthé.* The native histories make the siege occur in the year 1540, while the Portuguese account places it in 1544. The first is probably correct; the dates in the Portuguese history are not to be depended on. But the story of the siege is told in simple language, and reveals the dreadful doom of the Viceroy and his family, inflicted by the pitiless conqueror, which is passed over in silence by the native historians.† The account is as follows: "In the year 1544, the king of the Bramas, by sea and land, "besieged the city of Martavam, metropolis of the great and flourishing "kingdom of that name, whose yearly revenue was three millions of gold. "Chaubainaa was then king, and Nhay Canotoo Queen thereof, who from "the height of fortune fell to the depth of misery. The Brama fleet "consisted of 700 sail, 100 of them great galleys. In them were 700 Portuguese, commanded by one John Cayero, reputed a man of valour and "conduct. After a siege of seven months and five assaults, wherein the "Bramas lost 12000 men, Chaubainaa found it was impossible to withstand that power; provision being already so scarce, that they had eaten "3000 elephants. He offered to capitulate, but no conditions were allowed by "the besieger. He, therefore, resolved to make use of the Portuguese, to "whom he had always been very just and serviceable. But man never re- "members favours received in prosperity of those he sees in adversity."

The history then narrates how the unfortunate Viceroy entered into communication with Cayero, through Seixas, a Portuguese in his service, and offered, if supported by all of them, to become the vassal of the king of Portugal. But this was rejected, and a large body of men from the city having deserted, discovered the design to the besieger. The narrative proceeds: "The king thus betrayed, capitulated with the enemy for his own "and the lives of his wife and children, and leave to end his days in retire-

* The Burmese historian has somewhat carelessly applied the word Pán-thé to Muhammadans from India and Persia. In the present day, it is used to designate the Muhammadans of Yunnan only. All Muhammadans from countries west of Burma are called 'Pa-thí,' which is believed to be a corruption of 'Fársí.' The word Pánthé has probably a different origin. The Burmese became acquainted with the Muhammadans of Yunnan several centuries ago, from the caravans of those people trading to Ava. As their religion, and some of their customs, differed from those of the Chinese, they, to avoid the hateful name of foreigner, spoke of themselves as being Pan-ti or Pan-ti = indigenous, and thus, it is believed, the name originated in Burma.

† In the paper on the History of the Burma race, J. A. S. Bengal, Vol. XXXVIII, of 1869, it was stated that the governor of Martaban was pardoned by the conqueror. I am now satisfied that this was not the meaning of a somewhat obscure sentence in the Burmese history.

"ment. This and more was granted easily, because the conqueror designed to perform no part of the promise. From the city gate to the king of Brama's tent was a league distance, all which way was a lane of many thousand musketers of sundry nations, and next the gate were posted the Portuguese. The first came out was the Queen in a chair with her two daughters, and two sons in two others. About them forty beautiful ladies led by as many ancient ones, encompassed by Talegrepos (a sort of religious men among them, habited like our Capuchins), who prayed and comforted them. Then came the king guarded by his enemies, seated on a small she-elephant, cloathed in black velvet; his head, beard, and eyebrows shaved, and a rope about his neck, which moved even the enemy to compassion. The unfortunate king seeing the Portuguese, would not stir one foot till they were removed from that post, and that done went on. Being come before the king of Brama, he cast himself at his feet, but not being able to speak for grief, the Raolim of Mounay Talaypor, Chief Priest of those Gentiles, and esteemed a saint, made an harangue in his behalf, of force to have moved to compassion any other but that obdurate king. The miserable king, his queen, children, and ladies were secured. The two following days were spent in removing the treasure, at which a thousand men laboured, and it amounted to 100 millions of gold. The third day, the army had liberty to plunder, which lasted four days, and was valued 12 millions. Next, the city was burnt, wherein perished by fire and sword above 60,000 souls, besides as many made slaves; 2000 temples, and 40,000 houses were laid even with the ground. There were in the town 6000 pieces of cannon, 100,000 quintals of pepper, and as much of other spices. The morning that followed this destruction, there appeared on a hill, called Beydoo, 21 gibbets, with a strong guard of horse. Thither was led the queen with her children and ladies, in all making 140, and were all hanged up by the feet. The king and fifty men of great quality were cast into the sea with stones about their necks. The army seeing this barbarity mutinied, and the king was in great danger. He leaving people to rebuild the ruined city, returned to Pegu with the rest of his army, and among them John Cayero and his 700 Portuguese. Of these four stayed at Martavam."

King Tabeng Shwé hti, before his departure for Pegu city, received the submission of the governor of Maulamyáing, and took the precaution to guard the frontier towards Zimmé. At the ancient capital he was consecrated king. He put the fortifications in repair, and with great solemnity placed a new hti on the summit of the Shwé mau dau pagoda, and afterwards one on that of the Shwé Dagun. He thus proclaimed his sovereignty of the ancient Táláing kingdom. But he determined to push his conquests without delay. As a first step towards asserting his right to the throne of Ava,

he collected an army to advance against Prome, where Meng Kháung was tributary king under the Shan king of Ava, Thohánbwá, whose daughter he had married. Tabeng Shwé hti proceeded with his army up the Eráwati, Bureng Náung being the general in command. He invested Prome by land and water, but did not make any assault, as the place was strong and well defended with guns. While thus engaged, news arrived that the Shan king of Ava was marching down with a large army to the relief of Prome. Half of the army was sent to meet this force. It was under Bureng Náung, who attacked the Ava force with his accustomed vigour and utterly defeated it.* A force from Arakan also, brought to assist the besieged, was compelled to fly. The besieging force having sustained heavy loss, was compelled to trust to famine for the surrender of the city. The unfortunate king of Prome was at length forced to surrender, and proceeding to his conqueror's camp, attended by the superior of the Buddhist monks, implored mercy for himself and family. The native histories place this event in the year 904, or June 1542, the siege having lasted for seven months. The king and queen, it is stated in the Burmese history, were sent as prisoners to Táungu, and no more mention is made of them. The Portuguese history states that the siege occurred in 1546. This is incorrect, but the events recorded may, no doubt, be relied on. The queen of Prome, who was older than her husband, appears to have had the direction of affairs in the city. She offered to pay tribute, and hold the crown from Tabeng Shwé hti. But "the king insisted that the queen "should put herself into his hands with all her treasure; but she knowing "how perfidious he was, resolved to defend herself. He gave several assaults, "and by the sword and a plague that raged in the army, lost 80,000 "men, among which were 500 Portugueses." It is also stated that a mount was raised overlooking the town, and being well armed with cannon left no place of safety to the besieged. But in a sally, the besieged destroyed the mount, and carried off 80 cannons. Tabeng Shwé hti on this occasion was wounded, and "in a rage slew 2000 Portugueses that were upon the guard as negligent of their duty." Probably there is an error here in the number; 200 artillery men being more likely intended. The savage treatment of the king and queen is very different to what is narrated by the Burmese historian. "The queen was publicly whipped and delivered up to the lust of

* The Portuguese history has caused some confusion regarding the events which led to this siege by stating—"The king of Brama was alarmed by him of Siam, who attempted to recover the kingdom of Tangu, which had been wrested from him." For Siam here must be understood the northern Shan or Shian confederation, now led by the king of Ava. This king did claim the allegiance of Táungu, which state had formerly been subject to his predecessors. It was never claimed by Siam. The Siamese and Shians both belong to the Tháí race, and the early European writers may thus occasionally have confused the two. In Father Sangermano's work on Burma, the Shan people are always called 'Siam'.

"the soldiers until she died. The young king was tied to her dead body and cast into the river. The same was done with 300 gentlemen, after stakes were drove through their bodies."

Tabeng Shwé hti appointed one of the brothers of Bureng Náung tributary king of Prome, with the title of Tha-dodhamná Rádzá. He then returned to Hantháwati, where he endeavoured by works of religious merit to atone for the guilt of bloodshed. He cast a pure gold image of Budha, and next built a new palace. But he was not left long in repose. In Ava on the death of Tho-hanbwá, the chief of Unbáung named Khunmháing-nge had been elected to the throne. He determined to retake Prome. He marched down at the head of an army formed of the troops of seven Shan chiefs. Tabeng Shwé hti quickly came to the rescue of his tributary king. The Shans once more were defeated near Prome, and Bureng Náung followed them up the Eráwati, capturing all the cities as far as Pugán. He also appeared before Ava, but apparently thinking it too strong to be safely attacked, the army returned to Pugán, and there he established his frontier post.* The king having taken measures for the safety of his army, returned to Pegu, where he arrived in the year 906, or August, 1544. In the following year, he was again solemnly consecrated, assuming the title of King of Kings, which may be translated 'Emperor.' The tributary kings of Prome, Táungu, and Martaban were present to do homage; and Bureng Náung was formally declared Ein-Shé-meng, or crown prince.

About this time, the king of Arakan died, and Tabeng Shwé hti made an expedition to that country, to place his brother on the throne. The emperor appears to have failed to take the capital, but eventually the son of the late king, styled Mahá Dhammarit, on agreeing to present gold and silver flowers, was confirmed on the throne, and the emperor then returned to Pegu. This expedition occurred in the year 908, or A. D., 1546-47. The return of the emperor seems to have been hastened by news of a movement, which this time was really made by the king of Siam. That monarch had lately taken possession of Tavoy, a town which for many years had been a disputed possession between the two countries. The emperor determined to punish this aggression, not by seizing the town in question, but by marching on the capital of his enemy. All the arrangements were as usual entrusted to Bureng Náung. The emperor left his capital in the year 910 (November, 1548), and proceeded to Muttama (Martaban), where the army had already

* This expedition up the Eráwati, called the 'Qneytor' by the Portuguese historian, has by him been mixed up with the siege of Prome two years earlier. It is said that the invader returned from Ava, because he heard the king of Siam was coming to its relief. This can only refer to the northern Shans. In the native histories, no reason is given for the retreat from Ava, on this occasion. The Portuguese historian then refers to the Empire of Calaminam, and to affairs which occurred many years later, but of which the writer evidently had a very confused notion.

assembled. The plan was to march eastward from that city to Myawati on the Tháung-yin River, and from thence to the upper course of the Mo-nam, the 'mother of waters', on which river Yodaya, the then capital of Siam, was situated. The army occupied in succession the fortified cities of Kamánbaik, Tháuk-katé, and Pi-tha-lauk, and then moved down by land and water to the capital. But from the strength of the wall, the deep and broad moat, the numerous water courses, and the ships moored and armed with guns manned by foreigners, the city was deemed to be too strong for an assault, and the emperor, with the advice of Bureng Náung, determined to retire. In retreating towards Kamánbaik ('Camambée' of the Portuguese) and the other places they had captured, they were attacked by the Siamese, but entirely defeated them, and even took prisoner a son-in-law of the king's. According to the Burmese history, the king of Siam then entered into negotiations and promised, if his son-in-law were released, to pay tribute. This was agreed to by Tabeng Shwé htí, and the invading army then retired. The king returned to his capital in April, 1549.

The Portuguese history gives two accounts of this expedition; one in the first volume, in which it is (wrongly) represented as the second invasion of Siam by Tabeng Shwé htí, and states that the Portuguese who accompanied the army, were only 180 men under James Soarez; and another more detailed account in the third volume, in which the Portuguese force is stated to have been one thousand. Both accounts give the year 1549 as the date of the expedition, and the Burmese history states that it lasted from November 1548 to April, 1549. In the Burmese and Taláing histories, not a word is said as to the leader of the Portuguese, James Soarez de Melo, though they speak generally of foreigners. But there is no doubt that the guns, which were worked by the Portuguese, were regarded with great importance by the emperor. The Portuguese history after relating that an illegitimate son of a murdered king of Siam had succeeded to the throne, continues thus:—"The king of Brama, or Pegu, for it is the same, seeing the affairs of Siam in confusion, resolved to conquer that kingdom. He raised an army of 800,000 men, among which were 1000 Portugueses, 40,000 horse, 60,000 musqueteers, 20,000 elephants, 1000 cannon drawn by as many yoke of oxen and Abadas, and 1000 waggons of ammunition drawn by buffaloes. The Portugueses were commanded by James Soarez de Melo, called the Gallego, who came to India in the year 1538; in 1542, was pyrating about Mozambique; in 1547, was at the relief of Malacca; and in 1549, being in the service of this king, was worth four millions in jewels and other things of value, had a pension of 200,000 ducats yearly, and the title of the king's brother, was supream governor of all his dominions, and general of his army.* The king marched with that

* The position of Soarez is here perhaps exaggerated; but that he held a high

"prodigious multitude, and after one repulse took the fort of Tapurem, defended by 2000 Siamites, putting all to the sword with the loss of 8,000 men. By the way the city of Tuvopisam surrendered, and he sat down before Odiaa, the capital of Siam, which seemed to make no account of that great power. James Soarez, who commanded in chief, surprized hereat, gave an assault and lost 10,000 men. Another attempt was made with elephants, but with no better success. * * * * * Five months being spent with the loss of 150,000 men, news was brought that Xemindoo, a man of great parts had rebelled at Pegu and killed 15,000 men that opposed him. As soon as this was known in the camp, 120,000 Pegues deserted, in hatred to that foreign king that oppressed, and to the insolence of James Soarez who commanded them."

It appears that there were some Portuguese in the city under the command of James Percyra, who served the guns, and probably caused the failure of the attack. Certain differences are apparent in the accounts of the native historians and of the Portuguese, as to the causes which led to the retreat of the Burmese army. The former attribute it to the prudence of the king on seeing the great difficulties before him; and omit to mention the failure of an assault. The insurrection of Xemindoo in Pegu at this time also is not mentioned. But it broke out, according both to the Burmese and Taláing histories, immediately after the return of the army, and possibly the presence of the discontented Taláing soldiers was deemed a favourable opportunity. Before the insurrection, the Burmese history relates that king Tabeng Shwé hti had become utterly incapable from constant drunkenness, the liquor being supplied by a nephew of James Soarez, a youth to whom the emperor had taken a liking, and who was his constant companion.* At length, Bureng Náung banished this young man from the country, and then took the whole power into his own hands. His father, who was the tributary king of Táungu, had died in the previous year, and one of his brothers or kinsmen had been appointed with the title of Meng Khaung. Bureng Náung was the virtual ruler of the empire, and the acknowledged successor of the emperor, to whom he appears to have been a faithful officer.

It was in the month Pyatho, 911 (December, 1540), according to the Burmese history, that the insurrection of Thamin-ltau, or Thaminhtau rá ma, broke out. He is called by the Portuguese 'Xemindoo.' He is represented in the Taláing history as being a son of Binya Ran, the last king but one of the dynasty of Wararu, by an inferior woman of the palace. He had been

post is apparent from the Burmese history, in which subsequently his name occurs as Pits-tsa-rit, with the affix "Meng," or Lord. His miserable end will be seen hereafter.

* In a royal order, issued not very long ago, degrading an officer of high rank, this historical incident was referred to, as illustrating the evil effects of drinking intoxicating liquor, and the danger of familiar association with foreigners.

a Rahán, but threw off his monastic habit and became a layman. He then took the name of Thaminhtau, and began to collect followers in the delta of the Eráwati, where the Mun race was most numerous, and where a rebel force could most easily avoid attack. He was at first very successful, having taken Dála and even Syriam; he then marched boldly to attack Makau, a fort only sixteen miles south of the capital. Here he was attacked by troops sent from Hantháwati, and was defeated. He retreated to Syriam, where Bureng Náung routed his followers. He fled westward, and Bureng Náung followed him up, and fixed his head quarters at Dála, from whence he sent out parties in all directions to hunt down the fugitives. During this confusion, the emperor was under the care of the governor of Tsit-táung, who had the title of Thamin-tsau dwut, or Thamindurit. He is called by the Portuguese historian 'Xemin of Zatan.' This young man also was a scion of the Shan royal family of Pegu. He had been educated at the same kyoung as Thaminhtau, and was strongly recommended to the emperor by the Phungyí, or abbot, of the monastery. He was soon taken into favour, and was entirely trusted by Bureng Náung. His two younger brothers had appointments in the palace, one being commander of the emperor's bodyguard. The emperor had gone for change to a temporary palace at Pantarau, when a report was brought, no doubt to draw him away to a remote place, that a white elephant had been seen east of the Tsit-táung River, near the ancient city of Kátha. To capture a white elephant at this juncture would have a good effect on the whole people, and the emperor was easily inveigled into the jungle at the foot of the mountains. There he was murdered by one of the brothers of Thamindwut, in May, 1550. The latter at once proclaimed himself king at Tsit-táung, and soon after took possession of Hantháwati, where he was consecrated according to ancient custom.

Tabeng Shwé htí had reigned ten years in Táungu, his native kingdom, and ten years as emperor in Hantháwati. The Taláing history records that he made great gifts to the national pagodas of Shwé-maudau and Shwé Dagun; and that he constructed a road between Pegu and Táungu, with wells, zayáts, and gardens for the use of travellers. This road, which was well raised above the level of ordinary floods, still exists. He built a pagoda at Táungu, which was completed only the year before his death, as has been proved from an inscription on a silver scroll, discovered at that city a few years ago. The pagoda was built for the benefit, by means of the merit acquired by building it, of himself and family, and in memory of his father. He was only thirty-six years of age when he died.

Bureng Náung was at Dála when these events occurred, and finding the strength of the country against him, determined to march to Táungu. On the way he was joined by his wife who managed to escape from the city. When arrived at Táungu, he found that his brother Thi-ha-thu

would not open the gates to him. But all the best officers, Burma, Taláing, and Shan, had great confidence in him, and gathered to his camp. A force sufficient to blockade the city was thus collected. In Pegu, the struggle went on between the two Taláing chiefs, Thaminhtau and Thamindwut. The latter, in possession of the capital, exercised his authority with such cruelty, that the nobles called in his rival, who advanced with an army collected principally at Muttama. A battle was fought near the city in which Thaminhtau was victorious. Thamindwut was taken prisoner and beheaded. He had reigned for three months and a half. These events are thus recorded in the Portuguese history: "Xemindoo (Thaminhtau) rebelled against the king of Pegu (Tabeng Shwé hti), and sent James Soarez to suppress him. He followed him to the city of Cevadi, and he slipping by, got into Pegu,* because the city sided with him. The queen fled to the castle,† where she was defended by twenty Portugueses till the king came and put the rebels to flight.‡ The army entered the city and put to the sword not only men, women, and children, but even the beasts; nothing escaped, but what was within the liberty of James Soarez his house, which the king had ordered should be exempted.§ Above twelve thousand saved themselves therein. The plunder was unaccountable. James Soarez alone got above three millions. At his intercession, the king pardoned a Portuguese who had furnished Xemindoo with ammunition. Though the king escaped the hands of Xemindoo, he could not the villainy of Ximi-de-Zatan (Ximi is equivalent to a Duke, and he really is one of Satan's creations), who murdered him in the delightful city of Zatan.|| The traitor was immediately proclaimed king, and falling among the murdered Prince's men, killed three of those that belonged to James Soarez, who fled to the city Ova, and afterwards at Pegu was reconciled to this new king, till Xemindoo, who fled before, came on again with a powerful army. Ximi commanded James Soarez and his Portugueses to march with him against

* The Portuguese historian here confuses Thaminhtau (Xemindoo) with Thamindwut (Ximindezaton). The first did not enter the city of Pegu until he had conquered the last; whereas Thamindwut entered the capital in little more than a month after the murder of the Emperor. Covadi is Saráwadi, = Tharáwati.

† This may be either the queen of Tabeng Shwé hti or of Bureng. The latter as we have seen soon after joined her husband.

‡ This can only refer to Bureng Náung on his march to Táungu, when, though he was not attacked, he did not venture to enter Pegu city.

§ This sentence can only refer to the taking of the city by Thamindwut, when his army would be sure to plunder the city. The Portuguese historian has been puzzled by the numerous "kings," who in a short time enjoyed that title among the people.

|| Tabeng Shwé hti was murdered some distance from the city, but within the territory pertaining to Tsit-táung (= Zatan).

"the enemy ; but before he came thither, the punishment of his great inso-
 "lence reached him, as we shall see hereafter. Zatan was taken and beheaded
 "by Xemindoo, who gave out it was for the killing of Soarez, as if the
 "murder of the king had not been a more justifiable motive. Thus the
 "first rebel possessed himself of the crown till Mandaragri,* the late king's
 "brother-in-law, claimed it in right of his wife, and coming to a battle,
 "gave him such a total defeat, that Xemindoo fled to the mountains where
 "he married a poor fellow's daughter. He discovered himself to her, and she
 "revealed it to her father, at such time as great rewards were proposed to
 "such as should discover him. The father-in-law delivered him up to the
 "king who cut off his head."

In a subsequent part of the history, this story is again told, but with
 some variations, and the battle between Xemindoo and the king (Bureng
 Náung) is erroneously represented as having occurred before Xemin de Zatan
 became king, thus antedating the event by more than a twelvemonth.†
 The account is extracted, as it relates the fate of Soarez in the city of Pegu,
 after he became "reconciled" to the usurper. "Xemindoo was of the
 "ancient blood royal of Pegu, a great preacher and esteemed a saint. He
 "made a sermon so efficacious against the tyranny of princes and oppression
 "of that kingdom, that he was taken out of the pulpit and proclaimed king,
 "whereupon he slew 5,000 Bramas in the palace, seizing all the treasure, and
 "in a few days all the strongholds in the kingdom submitted to him. The
 "armies of the two kings met within two leagues of the city of Pegu. That
 "of Brama consisted of 350,000 men, Xemindoo's of 600,000. Of the latter
 "about 300,000 were slain, and 60,000 of the former. The victorious king
 "entered Pegu, and contrary to agreement slew many, and seized great trea-
 "sures. Meanwhile the city Martavam declares for Xemindoo, killing 2,000
 "Bramas. Xemin of Zatan did the same in the city of that name. The king
 "marched towards him, but he contrived to have him murdered by the way.‡
 "This was the end of that tyrant. Xemin was proclaimed king by his party,
 "and in nine days gathered 30,000 men. Chaumigrem,§ brother to the dead
 "king plundered the city and palace, and fled to Táungu, where he was born.
 "Xemin de Zatan became so odious by his ill-government, that in four months
 "many of his subjects fled, and some joined with Xemindoo, who made an
 "army of 60,000 men. Let us leave him awhile to relate the end of James

* Mengta-ragi, = Bureng Náung.

† Thamintau was defeated at Makau, sixteen miles from Pegu, before the other
 rebel had murdered the king. But that is evidently not the battle alluded to.

‡ As has already been seen, this entirely misrepresents the circumstances under
 which Tabeng Shwé hti was murdered.

§ Chaumigrem is another name for Bureng Náung, but is here probably meant
 for his half brother Thihathu, who left the capital when the king was murdered, and
 retired to Táungu.

"Soarez de Melo, after the wonderful rise already mentioned. James Soarez "passing by a rich merchant's house on the day after his daughter's wedding "and seeing the great beauty of the bride, attempted to carry her away by "force, killing the bridegroom and others who came to her rescue. Mean- "while the bride strangled herself. The father expecting no justice while "that king reigned, shut himself up, and never stirred abroad, till Xemin de "Zatan coming to the crown, he so lamented his wrong about the town, "that above 50,000 of the people gathered about him, crying out for justice. "The new king fearing some worse consequence, caused Soarez to be appre- "hended and delivered up to that rabble. This was accordingly performed, "and the multitude stoning him, he was in a minute buried under a heap "of rubbish. No sooner was that done, but they took the body from under "that pile, and tearing it in pieces, delivered it to the boys to drag about "the streets, they giving them alms for so doing. His house was plundered, "and the treasure found being much less than what was expected, it was "believed he had buried the rest. The new king, Xemin de Zatan, soon "followed James Soarez, for his subjects no longer able to bear his cruelty "and avarice, fled in great numbers to Xemin-doo, who was now master of "some considerable towns. He marched to the city of Pegu with 200,000 men "and 5,000 elephants. Zatan met him with 800,000, and the fight was "long doubtful, till Gonsalo Neto, who with 80 Portuguesees followed "Xemin-doo, killed Zatan with a musket shot, which opened the way for "Xemin-doo into the city, where he was crowned on the 3rd February, 1550. "Gonsalo Neto received 10,000 crowns for that fortunate shot, and his "companions 5000."

It may be well here to explain how the Portuguese historian has failed to recognise Bureng Naung when mentioned under other names or titles. He probably drew information from letters and reports sent by many different officers through a long series of years to the Viceroy at Goa, and these were not used for the history until about a century later. Bureng Naung was for ten years the general of the armies of Tabeng Shwé hti, and afterwards his successor. When he became emperor, he assumed different titles at different periods, and the writers of reports regarding him probably used these different titles, so that it would not be possible without some key to understand that they all referred to the same person. The term Bureng Naung is rendered 'Branginoco' by the Portuguese, and in some accounts his actions, under this title as general, are attributed to him as king. Mandaragi is a common title for a king, used in conversation. The term 'Chaumigrem' is for Tsheng-phyu-mya sheng, = Lord of many white elephants, one of the later titles assumed by Bureng Naung. The letter 'u' in Chaumigrem, is a misprint for 'n.'

In another part of the Portuguese history, as we have seen, it was

stated that "Zatan was taken and beheaded." Yet the fortunate shot of Gonsalo Neto is told very circumstantially and can scarcely be an invention. Perhaps the wound inflicted led to his capture.

Thaminhtau was now declared king, and was consecrated after the ancient custom in the capital. He is henceforth called in the Taláing history 'Dzag-ga-li Meng.' The Taláing historian dwells fondly on the details of the consecration, which was the last received by a native sovereign in Pegu.

While these events were passing in Pegu, Bureng Náung had forced the city of Táungu to surrender. He forgave his half-brother Thihathu, who had refused to acknowledge him, and had taken the title of Meng Kháung. Bureng Náung then caused himself to be consecrated king, as successor to his father who had been tributary king of Táungu under the late emperor. He next determined to possess himself of Prome, where another of his brothers had, under Tabeng Shwé htí, been tributary king, but of which a noble, styled Thadothu, had possessed himself. He marched across the hills, and after some delay Prome was surrendered by treachery, and Thadothu was put to death. His brother Thado Dhammá Rádzá was then reinstated as tributary king. It was now the year 913 (A. D., 1551), and Bureng Náung had possession of Táungu, Prome, and the country of the Eráwati as far north as Pugán. In Ava, a struggle for supremacy was still going on among the Shan chiefs, and Bureng Náung deemed the time propitious for asserting his claim to that kingdom as the successor of Tabeng Shwé htí. But hearing of attacks from the Pegu side on his territory, he considered it prudent first to settle affairs there, and concentrated his forces for that purpose at Prome and Táungu. Just then Mobyé Meng, king of Ava, being conquered by Tsithu-kyau-hteng, had fled and taken refuge in Prome. Bureng Náung determined to invade Pegu from Táungu, and marched to that city, taking Mobyé Meng with him. He set out on his expedition in April, 1551. His army consisted of 110,000 men, 400 fighting elephants, and 5000 horses.

In Pegu Thaminhtau, according to the Taláing history, had entered the capital in August, 1550. Having placed his own adherents in the several districts of the delta, he, in November, marched against the governors of Martaban and Maulmain, who had refused to submit. Having subdued both without difficulty, he returned to Hantháwati. He received an embassy from the king of Arakan, and did everything possible to make himself popular, and above all, to acquire religious merit by gifts to the pagodas and monasteries. But hearing of the surrender of Prome to Bureng Náung, he knew he would soon have to fight for his kingdom; and it was not long after, that news was brought that Bureng Náung himself was marching down by land from Táungu, and that a force under the king of

Prome was coming by water. He determined not to await attack in the city. The army took post at Muanu to await the Burmese enemy, and the battle took place close to the capital. A portion of the city was set on fire during the engagement by a force detached for that purpose by Bureng Náung, in order to alarm the enemy. Thaminhtau fought with courage, but his army was defeated, and he was obliged to leave his elephant, and mount a horse to fly from the field. He fled to Dala. Bureng Náung entered the city on the following morning. The battle was fought in the latter end of April, 1551. There probably were Portuguese on both sides in this battle, but no detailed account of it is to be found in the Portuguese history. The clearest reference thereto is in the following passage—"Chau-migrem who, the year before, retired to (from) Pegu, hearing afterwards that Xemindoo was unprovided, marched against him, and obtaining the victory, brought that crown again under the subjection of the Bra-maes. Xemindoo, taken some time after, was publicly beheaded." And again we read in another volume—"The first rebel possessed himself of the crown, till Mandaragi, the late king's brother-in-law, claimed it in right of his wife, and coming to a battle, gave him such a total defeat that Xemindoo fled."

Most of the Talaing nobles submitted to the conqueror. On the third day after the battle, Bureng Náung started in pursuit of Thaminhtau, who was striving to rally his followers in the forests of the delta. Being at last compelled to fly, he once more assumed the dress of a Phungyi, or Buddhist monk, and took refuge in the district of Bassein. From thence he found means to fly with a few followers by boat to Muttama.

Bureng Náung remained at Bassein until August, 1551, settling the affairs of that part of the country, and then returned to Pegu city. His first care was to repair the holy buildings injured during the war, and he built a Dzé-di over the remains of Tabeng Shwé-hti. Not long after, the unfortunate Thaminhtau, having been betrayed, was brought in. Bureng Náung offered him his life, if he would make obeisance; but this, the Talaing history states, he refused to do, and he died of a wound he had already received. The Portuguese account says that he was beheaded; and the Burmese historian merely observes, "An evil-minded man, had an evil death."

Muttama having now been occupied, another of Bureng Náung's brothers was made tributary king with the title of Meng-re-tai-thú. Bureng Náung assumed the title of King of Kings or Emperor; and his eldest son was declared Mahá Upá Rádzá, or Crown-prince. The emperor ruled over a wide extent of country, and prepared to assert his claim to the throne of Ava; for as the successor of Tabeng Shwé hti he assumed the title of king of the Burma race, though neither of them had reigned in the country of Burma proper. An army was sent up the Eráwati in July, 1553, under the

command of the Crown-prince. Either this was intended only as a reconnoitring expedition, or the strength of the king of Ava, Tsi-thú kyau hteng, had been miscalculated. The Crown-prince advanced no further than Pugán, and was then recalled.

During this year great exertion had been made to build the palace, which was completed in November, when a grand festival was held. The emperor was then, as stated in the Taláing history, consecrated according to the ancient ceremonies. Numbers of boats were being built in all parts of Pegu, and provisions were collected along the Eráwati as far as Pugán, with a view to an advance to Ava. In July 1554, the son and the nephew of the king of Arakan arrived. The latter was married to one of the emperor's daughters, and the former to a daughter of the king of Muttama. In November, the army of invasion set forth. The Crown-prince was left at the capital as his father's representative. The army in two main columns, one of which accompanying the flotilla, proceeded up the Eráwati route. The other with which was the emperor, marched from the capital to Táungu. From that city, the emperor led a corps across the hills to Táung-dwen-gyi, and on to Pugán, where they joined the water column. The remainder marching from Táungu under the emperor's brothers, Meng Khaung, king of Táungu, and Meng rai kyau hteng, entrenched themselves to the south of the ancient capital Pányá, to await intelligence from the emperor. The main army by means of the flotilla crossed the Eráwati to the western bank, probably because provisions were more plentiful there than on the other. The march was continued along the right bank, and up the Khyendwen to Amyen, where that river was crossed. The army then marched to Tsagáing, situated on the Eráwati opposite to Ava. The emperor's first care was to communicate with his brothers who were entrenched near Pányá. Arrangements for an attack on the city having been made, the two brothers issued from their entrenched position, but were at once attacked by Tsithu-kyau-hteng, the king of Ava. He was, however, defeated and forced to retire into the city. The emperor's army now crossed the river, and a combined attack was made. Ava was taken in March 1555, and the king, the last of the Shan dynasty, was made prisoner. He was well-treated and sent to Pegu. But two sons of the last native king of Pegu who were found here, were put to death. The emperor's brother Meng-rai-kyau-hteng was made tributary king of Ava, with the title of Tha-do-meng-tsau. The emperor delighted to continue Hantháwati as the capital of his empire, but determined to remain at Ava until the northern Shans were subdued.

It is much to be regretted that the Portuguese historian gives no account of this expedition, though it is almost certain that Portuguese are alluded to in the Burmese history, which speaks of four hundred Western

foreigners dressed in uniforms and armed with muskets, whose position was in front, flanks and rear of the emperor's elephant. In the following passage, however, the Portuguese historian no doubt alludes generally to the conquests of Bureng Náung, including the campaign of Ava. The "kingdom" of Pegu, before not very considerable, was raised to be one of the greatest "empires in Asia, by the king of Uva and Brama, assisted by 1,000 Portuguese under the command of Antony Ferreyra de Braganca, who served him as his natural prince."

Columns were despatched into the country north of Ava, and the emperor himself proceeded to Myé-du on the Mú River. But the rainy season being at hand, and the troops worn out with fatigue, it was deemed expedient not to advance further at this time. A garrison was placed there, and the emperor himself returned to Ava, and thence to Pegu, where he arrived in June, 1555. The new king of Ava remained in his capital.

The emperor had before determined to build a fortified post at or near the ground where he had defeated Thaminhtau, and it was completed in this year. This is referred to by the Portuguese historian in the following words: "The king, not thoroughly satisfied with the people of Pegu, built, not far from it, another great and strong city." The emperor was careful to observe what was required of him as a good Buddhist. Additional gold was placed upon his father's pagoda at Táungu, offerings were sent to the holy tooth relic in Ceylon, communication having been opened with Dhammápála, the king of that island. A scandalous custom which had hitherto prevailed, of annual sacrifices of animals to the Náts of the Mountain Pup-pa, which had existed from the time of the kings of Pugán, was suppressed as contrary to religion. In the Burmese history, it is stated that many thousands of people used to assemble annually to sacrifice bullocks, buffaloes, pigs, and other animals on this occasion.*

About this time the Tsaubwá of Unbáung having died, a dispute occurred among the relations as to the succession. The member of the family who succeeded was then attacked by the Tsaubwá of Moné, and he appealed to the emperor for assistance. The emperor deemed this an excellent opportunity for subduing the whole of the Shan country, and determined first to proceed against those in the north. A large army under the king of Táungu was assembled on that frontier to watch the southern Shans; while the emperor himself proceeded with his whole court to Ava, where a large army was also assembled. He arrived there early in 1557, and soon after proceeded up the Eráwati to Tsampanago, where his army was assembled. He then marched to Momeit, the Tsaubwá of which state had joined the enemy, while the king of Ava and other commanders proceeded against

* Similar customs still exist in some remote parts of the country, though utterly contrary to Buddhism.

Unbáung. The whole of the country east of the Eráwati was subdued and annexed to the kingdom of Ava. As many heretical customs existed among the Shans, the observance of these was prohibited. On the death of a Tsaubwá, it had been the practice at his funeral to sacrifice his riding elephant, his horse, and his favourite slaves, and bury them in one grave with him. This was in future strictly prohibited. Pagodas for worship were erected; kyongs were built, and orthodox monks placed in them, in order that religious duties might be exemplified and observed. Weights and measures were introduced in accordance with those existing in Hantháwati, and officers of justice appointed. Thus did the emperor provide for the temporal and spiritual welfare of the people. The emperor then determined to march against Modyin and Mogáung, which had formerly been subject to China.* For this purpose, he crossed to the west bank of the Eráwati, and after an arduous march north subdued both those states. The Mogáung Tsaubwá swore fealty, and the Monyin Tsaubwá was taken as a hostage, his son-in-law being appointed chief. The same reforms were introduced into these states, which had been enforced in Unbáung and Momeit. The emperor had now subdued the country as far north as the Patkoi range of hills, which separates Burma from Asám. He returned to Ava, and from thence proceeded to Pegu, which he reached in August, 1557.

But already another disturbance had arisen among the restless Shan chiefs. The Moné Tsaubwá had attacked the chief of Thí-bá. The emperor determined to punish both. In November, he marched to Táungu and across the mountains towards Moné. Many Tsaubwás had united their forces, but were defeated. The emperor pardoned the Moné chief on account of his youth; but in this and the adjoining states the reformed worship was introduced. These states received the name of Kambaudza, or this ancient name was now revived.

The emperor now held a council as to future proceedings. It was agreed that, as all the northern Shan states west of the Than-lwin river, except Thinní, had been subdued, nothing should at present be attempted in that direction. Thinní was still subject to China, and should not be interfered with. But it was determined to march against the Ywun Shans of Zimmé, after which it would be easy to occupy the country of the Gun or Gyun, Kyáing-run and Kyáing-tun, with other neighbouring states bearing collectively the classic names of Mahánágora and Khemáwára. The army was at once put in motion from Moné, and made twenty-four marches to

* The northern Shan states in the valley of the Eráwati had, no doubt, been tributary to China. In the sixteenth century, the Ming dynasty had become weak, and the Manchoes had begun to assail the empire. It was these circumstances, probably, which determined Bureng Náung to attack these out-lying districts of the Chinese empire.

the Hta-tseug-tsheik on the Than-lwin, where that river was crossed. From thence twenty-one marches brought the invader to Zimmé. The king of that country had determined to defend himself in his capital, which was well provided with jinjáls. The emperor, however, had so large a force with superior artillery, that he surrounded the city and compelled a surrender. The king swore fealty, the emperor asking him if even the great ruler of China could help him. He agreed to pay an annual tribute of elephants, horses, silk, and other natural products of his country. Many artificers with their families were carried away to Hantháwati. No religious reforms were considered necessary. An army of occupation, numbering fifty thousand men, was left in Zimmé, and was placed on the frontiers of Siam and Leng-dzeng. The emperor then set out on his return to Ava. Being suspicious of the conduct of the Tsaubwás of Mong, Ngyáun-ywé, and other states, they and their families were detained as prisoners. The Tsaubwá of Thinní appeared with presents, but was not required to make his submission. The emperor arrived at Ava, in August, 1558. There he remained settling the country and repairing the religious buildings. All the Tsaubwás in the hills east of Bamau appeared and did homage. While thus engaged, news was brought that the king of Leng-dzeng* was assembling a force, to attack the Burmese army in Zimmé. The king of Ava was at once sent with reinforcements, and he forced the king of Leng-dzeng to retreat. Some cities nearer to the Me-kong River were now occupied, and the king of Ava was then recalled. The emperor returned to Pegu in May, 1559.

He had before commenced the foundation of a pagoda, and the work was now pushed on. Numbers of supposed holy relics were placed in the relic chamber, with golden images of the family of Budha and his disciples, and of the royal family. The religious zeal of the emperor did not stop here. He was shocked at the number of animals put to death by the Muham-madans at the capital and other cities. Those people seemed actually to rejoice in taking the life of a goat or a fowl. The emperor desired to put an end to such sinful deeds. He built a magnificent Tatcháung, or place of assembly, and ordered the foreign people to attend. The true religion was then preached by the royal teacher, and numbers of the foreigners embraced the doctrine of the three treasures.†

* Leng-dzeng is the Burmese name for the ancient Laos kingdom, east of the Mekong, or river of Cambodia, of which either Muang Luang Phaban, or Vien Chan, called also Lantohiang, was the capital. It is now subject to Siam. See Captain McLeod's *Journal*, p. 89, and *Travels* by Louis de Carné, p. 125.

† There are in Pegu a number of families who are Budhists and in no way distinguishable from the people of the country, but who state that they are of foreign origin. They bury their dead and erect tombs over them; and they abstain from eating pork. In other respects, I am not aware that they have any peculiar customs. It is probable they are descendants of those converted by Bureng Náung, whose

The empire enjoyed rest for nearly three years. The chief of *Kathe* (*Manipur*) indeed made an encroachment on the territory of the *Kale Tsaubwá*, but this was soon settled. About the middle of the year 924 (A. D. 1562), a more serious attack occurred. The *Tsaubwá* of *Mo-mit* reported that some of his frontier villages had been attacked by the *Tsaubwás* from *Ho-tha*, *Tsánda*, and other states eastward of *Bamáu*. The emperor called a council, and observed he had no doubt but that these *Tsaubwás* depended on the assistance of the emperor of China, but, as before the destruction of *Pugán*, all that country was a part of the territory of that kingdom, he should punish this aggression. He sent an army under the three tributary kings of *Ava*, *Prome*, and *Táungu*, and his son, the crown-prince. The *Tsaubwás* then all appeared at *Bamáu* and swore fealty to the emperor. The religious reforms were introduced; pagodas and *kyoungs* were built, and orthodox *phúngyis* sent, in order that the four monthly worship days and other religious duties might be carefully observed. Times of payment for the royal revenue were fixed, and once in three years the *Tsaubwás* themselves were to come to the royal feet. Later in the same year, it was discovered that the *Tsaubwá* of *Tanenthari* had been sending presents to the king of *Siam*, and a small force was sent to supersede the *Tsaubwá*. But the commander was wounded and the expedition was a failure.

The emperor still had his designs against both *Siam* and *Leng-dzeng*, but was willing to forego them if the king of *Siam* would be reasonable. In open court he observed that in the time of the younger brother, (so he now designated *Tabeng-Shwé-htí*), *Siam* was a tributary country; that he neither wished for war, nor did he wish to worry his officers and the army; but the king of *Siam* had four white elephants and ought to present one. This appeared to his ministers and courtiers only reasonable. Messengers were, therefore, sent and the king of *Siam* was reminded that, in ancient times, his ancestor had presented a white elephant to *Wareru*, the king of *Pegu*, to whose rights the emperor had succeeded. The reply of the king of *Siam*, veiled in ambiguous terms, was interpreted as a refusal, and the emperor determined to march on the capital of his enemy. According to the *Burmese history*, the army consisted of four great corps, each under one of the three northern tributary kings and the crown-prince. Each corps consisted of 140,000 men, 400 fighting elephants, and 5,000 horses. The emperor's own guards under his immediate command consisted of 40,000 men, 400 fighting elephants, and 4,000 horses.* The army was composed measures for attaining the object in view were probably not so mild as is represented in the history.

* The Portuguese historian gives no details of the march of the invading army, and, it is probable, did not clearly distinguish the two sieges of the capital of *Siam* by

of men from all parts of the empire, Pegu, Burma, and the most distant Shan states. The plan of the campaign was for the several corps to march on Zimmé, those starting from Pegu getting as far to the north as possible; and none proceeding from Muttama by the route eastward, which was the route followed by Tabeng Shwé hti in 1548. From Zimmé it was intended that the river should be used to convey stores for the army down to Yodayá, the capital of Siam.

The main army left Hantháwati in November, 1563, and marching up the valley of the Páung-láung River as far as Táungu, passed the eastern mountain range at various points. The several corps were assembled at Zimmé or the neighbourhood, but the king of that country had refused to join the expedition and absented himself. All the places of strength in the territory of Zimmé had to be besieged, though some surrendered on being summoned. The invader thus occupied Tháuka-tó, Pithaláuk, and other cities, and Au-ga-dhammá Rádzá, a son-in-law of the king of Siam, was taken prisoner. Negotiations were now opened with the king of Siam, but he refused to come to terms. The invader gradually approached the capital Yodayá, and invested it on all sides. But it was necessary first to get possession of three ships mounted by Portuguese, which were moored in the river for the defence of the city, and were supported by batteries on shore. With great difficulty and loss these batteries were stormed, and the ships surrendered. The foreigners, it is said, were taken into the emperor's service. The king of Siam, disheartened at the loss sustained, now consented to appear before the conqueror, and though he was not required to do homage as a subject, he was dethroned, and his kingdom reduced to a tributary state. The king and his queens were carried off as prisoners and hostages, together with his younger son, styled Brá-rá-ma-thwun. The elder son, styled Brá-ma-hin, was made tributary king of Siam; the king's son-in-law and other members of the royal family were appointed governors at Pithaláuk, Tháuk-katé and other cities. These arrangements were made in March, 1564, and the emperor, after making all arrangements at Yodayá, set out with his prisoners for Pegu, where he arrived during the following June. He brought away three white elephants and numerous artificers.

The Portuguese historian, in the 3rd volume of his work, records these events in the following words, in which some errors will be observed: "For the conquest of Siam he led a greater force, possessed himself of the kingdom, and took the king and his two sons, called by reason of their

Bureng Náung, as well as that during the reign of Tabeng Shwé hti, when he was general. The following passage in the third volume appears to refer to the invasion now related: "The war began again between Chaumigrem, king of Pegu, and him of Siam. The army of Pegu consisted of 100,000 men, among whom were many Portuguese, and 17,000 elephants. All this army came to ruin."

"different colour, one the black, the other the white. He was content to leave that king in possession of the crown as his vassal, having himself been till then his subject,* carrying away his two sons as hostages. Branginoco returning victorious to Pegu, entered the city in triumph, many waggons going before loaded with idols and inestimable booty. He came at last in a chariot with the conquered queens, loaded with jewels, at his feet, and drawn by the captive princes and lords. Before him marched two thousand elephants richly adorned, and after him his victorious troops."

The emperor, notwithstanding this victory, was dissatisfied that nothing had been done to punish the king of Zimmé for his defection. He had retreated eastward, and was sheltered by the king of Leng-dzeng. Another large army was collected, and among the imperial guard and artillery one thousand Muhammadans and four hundred Portuguese are mentioned in the Burmese history. The emperor himself left the capital in November 1564, and proceeded to Labong, near Zimmé. A column under Binya Dála, an officer high in repute, took a southern route by Yaháing. All the Tsaubwás of the Yun tribe were anxious to support the independence of the king of Zimmé, but he himself came to the emperor and voluntarily submitted, saying that he did not wish to reign longer. He with his queen and their attendants then followed the emperor's camp. Troops were sent into the country east of Zimmé, to subdue the several petty chiefs.

While the emperor was thus engaged, a rebellion broke out in Pegu, headed by a Shan captive named Binya Kyan, with numerous Shan prisoners, and in which thousands of Taláings joined. They marched towards the capital, and the officers in command there were so alarmed, that they were on the point of sending off the empress and the whole of the royal family to Táungu for safety. They, however, took the advice of the deposed king of Ava, Narapati Tsithu, who pointed out that most of the rebel force were mere unarmed rabble, and might be easily checked. The ex-king was intrusted with a force, and went out and defeated the rebels close to the city. The leader was killed, and the rest fled into the thick woods of the delta. As soon as the emperor heard of this outbreak, he hastened back from Zimmé with a small force, and reached the vicinity of the city in June, 1565. Seeing that all the magnificent kyáungs and other buildings outside the city walls, which he had erected at vast expense, had been burnt by the rebels, he was so enraged, that without entering the city, he proceeded on to Dala to hunt them down. The king of Prome who had accompanied the emperor from Zimmé, was employed on this service; the rebels were utterly defeated, and several thousands of them taken prisoners. The whole of these the

* This apparently refers to the erroneous idea before mentioned, that Táungu had been tributary to Siam.

emperor intended should be enclosed in a vast temporary building of inflammable materials, and burnt alive as rebels according to Burmese law. The Burmese and the Taláing histories, however, both state that on the intercession of the Buddhist monks, Burmese, Taláing, and Shan, he pardoned all except the leaders, and those who had accepted titles from the rebel chiefs.

The emperor's eldest son, the crown-prince, had been left in command in the Yun country, and found great difficulty in subduing the chiefs, east and north-east of Zimmé. At length, they were driven to shut themselves up in Maing-zán, in which also was the king of Leng-dzeng and his family. The town was taken, and all were captured except the king of Leng-dzeng, who escaped in the confusion. The crown-prince leaving his sick and wounded in the town, followed up the fugitives, but the Burmese army suffered from want of food and long marches, and after much loss was forced to return to Maing-zán. The crown-prince then sent to Pegu all who were able to travel, with a report to the emperor of the difficulties encountered. Orders* were at once issued for the return of the army, and the crown-prince reached Hantháwati in October, 1565. The queen of Leng-dzeng, and the whole of the prisoners of high rank, were brought and placed in the palace.

The emperor now occupied himself in building new city walls and other public works. The outer wall or rampart was a square of seven thousand yards on each face. There were five gates on each face, each gate being constructed by a tributary king and called after him. A new palace was likewise built, to which the tributary kings contributed materials. The whole was finished in March, 1567, when a grand festival was held.*

The last expedition of the emperor against the king of Zimmé appears to be referred to in the second volume of the Portuguese history in the following words: "Then he marched with an army of 1,600,000 men "and overran many neighbouring countries. But another rebellion breaking out at Pegu, the queen was forced to fly to the castle, chiefly relying upon thirty-nine Portuguese, who defended her till the king came and vanquished the rebels. Then the king sent an officer to bring those men who had defended the queen to his presence. He brought him some Moors of note. But the king knowing the Portuguese were the men, said in anger, 'I sent you for men, and you bring me cowards; go, bring me men.'

* Of this palace the Portuguese historian writes: "He built a palace as big as an ordinary city. The least part of its beauty was rich painting and gilding, for the roofs of some apartments were covered with plates of solid gold. Some rooms were set with statues of kings and queens of massive gold, set with rich stones, as big as the life. He was carried on a litter of gold upon many men's shoulders; the reverence paid him was more like a God than a prince." He called this palace, which was a vast collection of grand pavilions, *Kambansa détha* after one of the Buddhist countries of India.

"The Portugueses being brought, he bid them ask whatever reward they would, and they with the surprise doubting, the king loaded them with riches, praises, and honours."

In the Burmese and Taláing histories, the Portuguese are not mentioned as contributing to the suppression of the rebellion in 1565. Although it is stated that the officers in command, during the emperor's absence, were utterly bewildered, the whole credit is given to the deposed king of Ava, and to an officer commanding a body of light troops detached by the emperor from Zimmé, and who advanced by forced marches on the capital. But it is evident that in the native histories, the services rendered by the Portuguese are systematically suppressed, and there appears no reason to doubt the truth of the anecdote above related.

The king of Leng-dzeng continued to make demonstrations against the towns in the Zimmé territory held by the emperor's officers. But his son-in-law came in and made his submission. Everything now looked promising. The capital was crowded with people, and was a scene of constant bustle and alacrity. But suddenly rice became scarce, which caused much suffering. The deposed king of Siam became a Rahan, and was permitted to go to his own country to worship. His son Bra-rá-ma-thwun had died, and his widow was allowed to return to Siam with her children. The tributary king of Siam now begun to take measures for once more being independent, and in this was supported by his father. But his brother-in-law, who was governor of Pithaláuk, would not join them, and leaving his government, came to Hantháwati with his family, where he arrived in June, 1568. The emperor saw that another invasion of Siam would be necessary, and began to make preparations. But as the campaign could not commence in the rainy season, he contented himself with strengthening the garrison of Pithaláuk and the king of Siam's son-in-law was sent back there. The reigning king of Siam determined to attack Pithaláuk at once, and the king of Leng-dzeng appeared with an army to help him. But the garrison resisted all their efforts by land and water. Their force became so reduced, that they at length drew off to a distance.

The emperor had collected even a larger army than before to march against Siam. It consisted of 5,300 fighting elephants, 58,000 horses, and 546,000 men. In the emperor's bodyguard were 4,000 Portuguese, and 4,000 Muhammadans, all armed with muskets, and cannon in great numbers. The army marched in October, 1568, and in forty-seven marches had reached sufficiently near Pithaláuk to relieve that place. The old king of Siam who had been deposed, appears to have resumed his position, having thrown off his monk's gown. He had made great preparations for the defence of the city, and his son Brámahin who had resigned power to his father, nobly seconded him. On the upper Menam and its tributaries, the emperor

collected numerous boats to convey stores of all kinds for the army on its march down to the capital. The commander under the emperor was Binya Dala, through whom all orders were issued. A portion of the army remained in the upper Menam to plant rice when the rain began to fall, in case there should be a scarcity lower down. The army invested the capital without any resistance. The emperor had determined to reduce it by famine. But after four months, that is, in May 1569, little or no effect had been produced. At this time the old king of Siam died, and his son Brámahin made some overtures for surrender, but these were not accepted. The losses in the Burmese army had been very severe, and the emperor becoming anxious, put two of his superior* officers to death for neglect of duty. At this time, the king of Leng-dzeng approached with an army to relieve the capital. The emperor leaving Binya Dala in command, himself proceeded with the crown-prince and other officers, and a battle was fought in which the Laos king was defeated. The king now returned to renew the siege. Affairs had become very serious and the emperor had recourse to a stratagem. One of his Siamese supporters, a noble of high rank, pretending to desert, entered the city with irons on his legs. He was received with joy by Brámahin, and appointed to a high command. In pursuance of his treacherous design, he maintained a correspondence with the emperor, and opening one of the city gates allowed the enemy to enter. The city was taken in August, 1569, after a siege of seven months. It was given up to plunder. The unfortunate king Brámahin was made prisoner.* The emperor remained in the city of Yodaya for two months, and appointed Tháung-kyi, a member of the Zimmé royal family, tributary king of Siam. In a council of all the principal officers, it was decided, that it was now essential that the king of Leng-dzeng should be followed up. Sending back all surviving disabled men to Pegu, and an immense quantity of plunder, the emperor himself proceeded up the Menam, and fixed his head quarters at Pithaláuk. From thence the several divisions of the army marched eastward. After a long and tedious march, the emperor encamped on the right bank of the Mekong, opposite Máing-zán. Nothing had been heard of the corps commanded by the crown-prince and other generals. Orders were issued to fell trees, to prepare boats and rafts, to cross the river. A bridge of boats was at last made by which the army passed, and the enemy deserted Máing-zán. The other divisions, after great sufferings, had crossed the river some distance to the north, and now marched down to join the emperor. Máing-zán being made a depôt for stores and the sick, the king of

* Nothing more is said of this king in the Burmese history. Both that and the Taláing history dwell on the death of the old king and of the generosity of the conqueror in giving him a grand funeral. His son, it would appear, committed suicide, as we learn from an old Venetian traveller quoted hereafter.

Táungu was left in command, while the rest of the army under the emperor marched in pursuit of the enemy. The Leng-dzeng king was too wary to come to an engagement, and the invaders were wearied with long marches and want of food. At length, they returned to Máing-zán, and the whole army re-crossing the Mekong reached Pithaláuk, in June 1570.* From thence the emperor reached Hantháwati in the following month. Of the original army which marched to subdue Siam, very few survived.

The emperor's first care after his arrival was to make rich offerings to the pagodas; to cast fresh images in precious metals, and to complete a new Hlwut dau, or royal council chamber, within the palace. He had turned his attention to foreign trade by sea, and built a ship of his own, which he sent loaded with merchandize to Melaput (?) and other ports of Ceylon and Southern India. In 1571, a rebellion of the northern Shans of Mo-gáung and Monhyin occurred. A force under the crown-prince and the king of Ava was sent against them; but the Tsaubwás could not be found, and the army was recalled. During this interval, the king of Leng-dzeng for some unexplained reason made an attack on a city belonging to Cambodia,† and was killed. One of his nobles usurped the throne. But the emperor, who had the deceased king's brother, named Ubarit, at his court, determined to support his claim, as he consented to become a tributary. An army was sent under the great general Binya Dala, to place him on the throne, but the expedition was unsuccessful. He was either put to death or sent into exile to a sickly place where he died. Binya Dala appears to have been a native of Pegu, but probably of Shan descent.

The last expedition of Bureng Náung against Siam, and afterwards into Laos, is related by the Portuguese historian in such a manner, that he appears to assert that the city of Yodayá was not taken. The fact of its surrender, however, admits of no doubt, though from the great loss sustained by the besiegers, it probably would not have fallen, had it not been for the treachery which has been related. De Sousa, after relating the capture of the Siamese princes in the first siege, but apparently not knowing that their father, the senior or first king of Siam was carried off as a hostage, proceeds thus: "After some time, the two brothers asked leave of the king to visit their father, which he granted, and afterwards sending to demand the usual

* This is probably a mistake for June, 1569, as will be seen farther on.

† Cambodia is called in the Talking history 'Khameng,' probably a corruption of the native name Khmer. Cambodia seems to be the Portuguese form of Kamphoutche, which itself is probably derived from Kambauza, the name of an ancient Buddhist country of India. All the Indo-Chinese nations have been in the habit of calling their cities after famous Indian cities. A portion of the Shan country was also called Kambauza, and the country east of Baman was named Kowambi, which in popular language has been changed to Ko Shan pyí. Yodayá, the capital of Siam, is the Indo-Chinese form of the famous city of Ráma.

"tribute, the black Prince refused to pay it. The king in a rage sends his great favourite Banna, with a powerful army against him. Banna ravaged the country of Siam, and besieges the Prince in Hudixa, who defended it so bravely, that Banna being forced to draw off, he fell upon and totally defeated him. The king sends his brother-in-law with a greater power, and he receives a greater overthrow; 200,000 of his men were cut in pieces with a great number of elephants and horses, many more of both taken. The black Prince remained victorious, his men were enriched and all encouraged to follow their good fortune. The king of Pegu raises another army of 1,700,000 men, 1500 elephants, 80,000 horses, and all necessaries proportionable. The command of it he gave to Mapa Raja* his son, with the title of king of Siam, not doubting of the victory. At the news of this power, all Siam trembled except the valiant black, now king, who met his enemy and gave him battle. The two kings encountering on their elephants fought, and he of Pegu was cast dead off his elephant, at which sight his men fled and the Siamites pursued them a month, destroying the greatest part of that vast army."

This account seems to mix up the three or rather four separate expeditions which we have given from the native histories. The first against Yodayá, where, though Bureng Náung was victorious, it was with immense loss; the two expeditions into Leng-dzeng, the last being under Binya Dala and both unsuccessful; and that, to put down the insurrection of the northern Sháns, under the crown-prince, which was also a failure.

Some light is thrown upon this period of the history by the narrative of Master Cæsar Fredericke, the Venetian, who, as translated in Purchas, states as follows:† "Sion, or Siam, was a great city, but in the year 1567, it was taken by the king of Pegu. The number of his army was a million four hundred thousand men of warre. I was in Pegu six months after his departure, and saw when that his officers that were in Pegu sent five hundred thousand men of warre to furnish the places of them that were slaine and lost in that assault. Yet for all this, if there had not been treason against the citie, it had not been lost; for on a night there was one of the gates set open, through the which with great trouble the king gate into the city, and became governor of Sion; and when the emperor saw that he was betrayed, and that his enemy was in the city, he poisoned himself; and his wives and children, friends and noblemen that were not slain in the first affront of the entrance into the city, were all carried

* This means Upa Rádsá—the Yuvaraja of the ancient Hindus,—which was the title Bureng Náung conferred on his eldest son. It is equivalent to Ein-She Meng of the present day.

† Cæsar Fredericke, seems to have been in different parts of Pegu during 1567, 1568, and 1569.

"captives into Pegu, where I was at the coming home of the king with his triumphs and victory ; which coming home and returning from the wars, was a goodly sight to behold, to see the elephants come home in a square, laden with gold, silver, jewels, and with noblemen and women that were taken prisoners in that city."

It will be remarked that there is a difference of one year in the date given in the Burmese history, and that by Cæsar Fredericke as to this invasion of Siam. The difference is extended to the date of "the coming home of the king," which the Venetian traveller apparently places in 1569 ; and the Burmese history in 1570, after the conclusion of the expedition into Leng-dzeng.

Cæsar Fredericke visited Martaban where, as he states, "we found ninety Portugals of merchants and other base men, which had fallen at difference with the Rector or governor of the citie. At that time, the city was empty of men, by reason they were gone all to the warres, and in business of the king."

He then proceeded to Pegu, "which are two cities, the old and new. In the old city are the merchant strangers, and merchants of the country. The merchants have all one house, or Magason, which they call 'Godon,' which is made of bricke, and there they put all their goods of any value. In the new city is the palace of the king, and his abiding place with all his Barons and Nobles, and in the time that I was there, they finished the building of the new city. It is a great city, very plain and flat, and four square, walled round about, and with ditches that compass the walls about with water, in which ditches are many crocodiles. It hath no draw-bridges, yet it hath twenty gates, five for every square, on the walls. There are many places made for centinels to watch, made of wood, and covered or gilt with gold. The streets thereof are the fairest that I have seen ; they are as straight as a line from one gate to another, and standing at the one gate you may discover the other ; and they are as broad as that ten or twelve men may ride abreast in them. And those streets that be thwart, are fair and large. The houses be made of wood and covered with a kind of tiles in form of cups. The king's palace is in the middle of the city, made in form of a walled castle, with ditches full of water round about it. The lodgings within are made of wood, all over gilded, with five pinacles, and very costly work covered with plates of gold." The whole of this description of the city of Hantháwati, and of the palace, would answer for the present capital Mandalé, except that the streets of the latter are broader than is here indicated, and that the palace wall has no ditch. The traveller gives an intelligent description of the army of the king of Pegu ; of the war elephants ; the "good ordnance made of very good metal ;" he hath "eighty thousand harquebuses, and the

number of them increaseth daily ;” the rest of the soldiers are armed with bows and arrows, pikes and swords, “ but their armour and weapons are very naught and weak ;” this was compared with the European armour and heavy pikes of the period. The account given by this observant traveller shows that the native histories do not exaggerate his power and magnificence. Indeed, they state the number of his soldiers much below that given both by the Portuguese historian and the Venetian. The latter concludes this part of his narrative by stating—“ The king of Pegu hath not any army or power by sea, but in the land, for people, dominions, gold, and silver, he far exceeds the power of the great Turk in treasure and strength.”

The traveller also describes how “ the king sitteth every day in person to hear the suits of his subjects,” he sitting “ up aloft in a great hall on a tribunal seat, with his Barons round about ;” while on the ground “ forty paces distant” are the petitioners “ with their supplications in their hands, which are made of long leaves of a tree,” and a present or gift according to the weightiness of their matter.” If the order be favourable, “ he commandeth to take the presents out of their hands ; but if he think their demand be not just or according to right, he commandeth them away, without taking of their gifts or presents.” So the pitiless Bureng Náung had a conscience, when sitting as a king to hear his people’s complaints.

The Taláing history records that the emperor desired another expedition to Leng-dzeng, to retrieve the last disaster there, and “ destroy the head and not the mere tail of the cobra.” The levy of an army was commenced, but the people murmured loudly, and many were heard to say that it was better to die at home than to perish of hunger and fatigue in a far country. The Shans were equally discontented, and some of the Tsaubwás, it is said, were supported in their opposition by the emperor’s half brother and son-in-law, the king of Ava. The project was deferred for the present, but in 1574, the emperor determined to place Ubarit on the throne of Leng-dzeng. He marched in October of that year, and arriving at Máing-zán, laid in stores of grain. He did not march into the country, but issued a proclamation that he had come to place the rightful heir upon the throne. He then bestowed, the regalia upon Ubarit with much good advice, and departed, leaving his tributary at Máing-zán with some troops. He reached Hantháwati in May, 1575. But a new expedition against Mogáung and Monyin had now become necessary ; for those restive states had refused to join the last expedition to Leng-dzeng, and were in open revolt. A force directed by the emperor himself proceeded north from Ava. The Tsaubwá of Monyin was killed, but the other fled, and though the troops followed him into regions where there was only snow for water, they could not capture him. In Leng-dzeng, however, the course of events was more fortunate. The usurper was delivered up by his own officers, together with his son, and the

Burmese commanders, apparently glad to leave, returned at once with their prisoners to Zimmé. There a portion of the force remained, and the remainder came on to Hantháwati. These important prisoners were forwarded to the emperor who was still at Mogáung, as the exhibition of them in that quarter would, it was considered, have a good effect. The Tsaubwá of Mogáung, however, could not be caught, and the emperor, recalling his son and other officers from the pursuit, returned to Pegu, and reached his capital in July, 1576.

There a great triumph awaited him. The emperor had long been in communication with ports on the coast of India and with a Buddhist king in Ceylon. He was the most powerful protector of the three treasures in Indo-China, and his support was naturally sought for by the now petty rulers in the holy island of Buddhism. Two years before, a Singalese princess had arrived and had been received with high honour, though the Portuguese historian asserts that the lady sent was only a daughter of the chamberlain of the king of Colombo. Now, at the very time the emperor returned to his capital, news was brought of the arrival of the holy tooth relic of Gautama Budha in a ship at Bassein. As the season was unfavourable for the ship to come to Pegu, a deputation of all the nobles of the highest rank was sent, and they bore a golden vase, adorned with the richest jewels taken from the conquered kings, in which the precious relic was to be deposited. A letter was also received from Dhammápála, the king of Ceylon, announcing that he was the only orthodox king of the four who ruled in the island. Arrangements were made for building a suitable pagoda for the reception of the relic; and with reference to Dhammápála's complaints of his being rather overborne by the three heretical kings, an envoy with a small force selected from all the various races in the emperor's army, was despatched by sea to Ceylon. This, it is intimated, had the effect of causing the Buddhist king to be much respected, and the envoy then returned.

The Portuguese historian places the arrival of the pseudo-princess and the pseudo-relic at the same time, but otherwise his statement appears substantially correct. It is as follows: "Among the treasure lately taken from the king of Jafanatapan, was an idol adored throughout all the coast of Asia, and so highly esteemed by all those princes, particularly the king of Pegu, that he every year sent ambassadors with rich presents to get a print of it." The king of Pegu hearing that the Portuguese Viceroy had this idol—the tooth relic—, offered 300,000 ducats for it. This was refused, and the tooth was beaten to dust in a mortar and burnt at Goa, by order of the Viceroy Don Constantin. "All men," adds de Sousa, "at that time seemed to applaud the act; but not long after, two teeth being set up instead of that one, as shall be related in the government of Don Antony de Noronha, they as much condemned and reviled at it." As to the

Princess, the Portuguese historian relates—"Brama, king of Pegu, being told "by astrologers that he was to marry a daughter of the king of Colombo; sent "to demand her, and he had never a one; but his chamberlain had one the "king esteemed as his own." He agreed also to give the tooth in dowry with the bride. They were received "with the greatest pomp that ever has "yet been heard of. Many galleys were fitted out, but that which was for "the queen, was covered with plates of gold, and rowed by beautiful young "women, richly clad, and brought up to this exercise. The king of Candea "understanding the deceit of this marriage, and envying that great fortune, "acquainted Brama* therewith, offering him a true daughter and tooth, "and affirming both that of Columbo, and the other of Don Constantin "were counterfeit, and the true one was in his hands." Nothing of this is to be found in the Burmese or in the Táláing history; the relic, though received with much pomp, disappears from history, and from the memories of the Buddhist nations, where, if believed in, it would have been enshrined for ever. It was deposited in the relic chamber of a Zedi built to receive it, and in which gold and jewels of such immense value were placed, that the Zedi was probably broken into, and the relic chamber plundered, in the time of the Portuguese adventurer, Philip de Brito, about twenty-five years later.

After the acquisition of this relic and, it is inferred, from its good influence, the Tsaubwá of Mogáung was surrendered by his chiefs to one of the emperor's sons, styled Thá-yá-wati Meng, who had been sent with a detachment into that country. The young chief was brought to Hanthá-wati, and the emperor reproached him with his ingratitude, after the kindness with which he had formerly been treated. His life was spared, but he was exhibited at one of the city gates in fetters for seven days, after which he was released. About one hundred of his followers who had supported him in his gallant resistance, were sold as slaves to Kulá merchants, and being put on boardship were sent beyond sea. The emperor had thus rid himself of his most troublesome enemy, but affairs in Leng-dzeng were not satisfactory. To strengthen his position in that quarter, he now appointed his son, the Thá-yá-wati Meng, who had shown great energy and ability, tributary king of Zimmé. He left for his kingdom in March, 1578, and the emperor enjoined him to remember that he owed allegiance to his elder brother the Upa Rádzá. He received the title of Náurahtá Dzáu. But the emperor, from the anxious care he took to bind the two brothers together, seems to have foreseen the danger of future struggles among the tributary

* Bramá was the usual Táláing pronunciation of the national name for what we now style Burma, or as now written by the Burmese, Mrammá and Bamá, but originally Brahmá. Bureng Náung, as already explained, claimed to represent the ancient Burma race, and is thus correctly designated by the Portuguese historian.

kings of the empire he had founded. It was again necessary to send an army into Leng-dzeng. A pretender had appeared claiming to be the dead king Bya-tsétsít, and Ubarít was unable to meet him in the field. The Upa Rádzá set out in October, 1579, and marched to Máingzán where Ubarít joined him. The expedition was successful, and the crown-prince returned to Pegu in the spring of 1580, bringing some prisoners of importance.

The emperor had now subdued all the enemies with whom he had fought for so many years. Even Leng-dzeng was to a considerable extent subject to his tributary king. Instead, however, of resting or granting his subjects relief, he turned his attention to Arakan. The king of that country, he observed, desired to be independent, contrary to his engagement, and it was necessary to coerce him. A large fleet of vessels and boats of all sizes were collected, in which an army of eighty thousand men was embarked, and the fleet proceeded to a point on the south coast of Arakan, where the men landed and marched to Thán-dwé (Sandoway) in November, 1580. The force was commanded by one of the emperor's sons, who received the title of Thirithu-dham-má Rádzá. He entrenched himself at Thándwé, and awaited further orders as to an advance on the capital of the kingdom. This expedition is noticed by the Portuguese historian, who states that a ship belonging to the king of Pegu was loading at Mazulapatan. The governor sent some ships to seize it, on what account is not stated. They did not encounter it there, but afterwards near the mouth of the river Negraes, and there sunk it. Near this, they met the Prince of Pegu with a fleet of 1,300 sail, designed for the conquest of the kingdom of Arakan. A fight took place, the Portuguese disabled and took some of the enemy, but were obliged to withdraw, on account of the great number opposed to them, and got into the port of Arakan. The Portuguese then considered themselves at war with the emperor of Pegu, which probably resulted from his interference with the petty kings of Ceylon. In the native histories no notice is taken of this attack on the Burmese fleet. The army sent by the emperor seems to have remained inactive at Than-dwé for nearly twelve months. In October 1581, reinforcements were sent, but these did not go by sea. The emperor's days, however, were numbered, and before the whole of the reinforcements reached their destination, he died very suddenly in November, aged sixty-six years, and after a reign of thirty years in Hanthá-wati. There is a studied obscurity in the native histories as to the lineage of Bureng Náung, but as he had in early life married a sister of king Tabeng Shwé hti, it is probable that he belonged to the royal family of Táungu.

No. 3.

List of the Kings of Pegu of Shan race, who reigned after the re-establishment of the kingdom under Waré-ru, A. D. 1287.

Names or titles of Kings.	Commencement of reign.			Length of reign in years.	Relationship of each succeeding king.	REMARKS.
	Year of religion.	A. D.	Burmese era.			
1 Wa-ré-ru,	1287	649	19	...	A Shan chief who established the dynasty, but had his capital at Mnttama.
2 Khun-lán, or Tha-ná ran-bya-keit,	668	4	Brother.	
3 Dáun-ín, or Theng-mháng,	672	13	Nephew.	
4 Dáun-dzip, or Binge-ran-da,	685	7	Brother.	Son of No 2, Khun-lán.
5 Binya-é-lán,	692	18	Cousin	
6 Binya-á, or Taheng-phyá-abeng,	710	37	Cousin.	
7 Binya-nwé or Ré-dá-di-rít,	747	38	Son	Son of No. 4, Dáun-dzip. This king restored the ancient capital Pegu.
8 Binya Dham-má Ré-dá,	785	3	Son.	
9 Binya Rán-keit,	788	20	Brother	
10 Binya Wa-ré,	808	4	Nephew	Reigned seven months.
11 Binya Keng,	812	3	Cousin.	
12 Mhán-dán,	815	...	...
13 Sheng-táun-bu, Binya-dán (Queen),	815	7	...	Daughter of No. 7, Hádá-di-rít.
14 Dham-má Dá-di,	822	31	...	Not of royal race.
15 Binya Rán,	853	35	Son.	Son-in-law of No. 13, Sheng-táun-bu. Conquered and deposed by Tabeng Shwé hti, king of Táungu, A. D. 1540.
16 Ta-ká-wut-bi,	1526	888	14	Son.	

Notes on the age of the ruins chiefly situate at Banáras and Jaunpúr.—By the late MR. CHARLES HORNE, B. C. S.

The following notes refer chiefly to the ruins at Bakharyá Kunḍ at Banáras, full accounts of which have appeared in the Journal of the Asiatic Society of Bengal for 1866, and those at Jaunpúr, viz., the three great mosques of Aṭálah-Lál Darwázah and the Jámí Masjid; although a large portion of them will apply to many other buildings in this part of India.

Up to the winter of 1870, I had always believed, and my belief had been strengthened by the opinions of others, but these buildings had in general been built upon Buddhist or ancient Hindú substructures, or had been altered and converted from such buildings for Muhammadan purposes. They had been so treated by the Rev. M. A. Sherring and myself, when describing them, and General Cunningham, Archæological Surveyor of India, appeared to be of the same opinion. Thus these substructures would date very early, even to 300 and 500 A. D., at least.

My attention to the subject of this alteration and conversion had been first aroused by Mr. Fergusson's admirable account of such conversion, and most of these buildings shew traces of such alteration. But happening to refer to Mr. Fergusson's History of Architecture, Vol. II, page 663, for a description of Indian Saracenic Architecture, the edition now used by me being of a later date than that I possessed before the meeting in 1857, I find that the writer, speaking of Bakharyá Kunḍ near Banáras, says, that "there is a singular group of tombs and other buildings by the Moslems which are singularly pleasing specimens of the Jaunpúr style."*

In the upper part of the page, there is a description of the gránd old Aṭálah Mosque (الآلة) at Jaunpúr, in which Mr. Fergusson says that he was "almost inclined to agree with Baron Hügel in considering this a Buddhist monastery." I have lived five or six years in the immediate vicinity of all these buildings, and have examined them most carefully and duly weighed all the evidences of antiquity I met with, and I entirely agree with Baron Hügel in holding that much of the substructure as well as the general plan is Buddhist or Ancient Hindú. If so, they are most interesting examples of their class and built examples of an ancient style which Mr. Fergusson holds not to exist in India at the present time. Hence the subject assumes great interest, and is worthy of careful and temperate discussion. Unfortunately, to be properly dealt with, it requires many plates.

In two manuscript copies of the Jaunpurnámah, or 'History of Jaunpúr,' which I have compared, and which was compiled some seventy years

* In a footnote to the same page we find :—Journal of the Asiatic Society of Bengal, for 1866 (should be 1866). There however, they are mistaken for Buddhist remains, which they are not."

since by Khairuddín Iláhábádí, a most learned Muslim of the city, from manuscripts and from local oral tradition, the Aṭálah Masjid is spoken as an existing idol temple when Fírúz Sháh founded the city. In this record we are told that Rájah Jay Chand overcame the giant Karabir, who resided at Jaunpúr, and destroyed an idol temple; but this temple would seem rather to have stood on, or below, the site of the Fort of Jaunpúr, and of it but few traces remain. These consist of carved stones built into the mosque, which was afterwards constructed chiefly thereof in the Fort area.

This view is supported by the fact that, in 1858-59, when mines were drawn under the fort for the purpose of destroying the fortification, carved stones and fragments of friezes were dug out, of the same patterns as those used by the Muslims in their erection of the propylus of the mosque of Aṭálah. This fort dates (as a fort) with the bridge, or perhaps a little earlier, *i. e.* the latter part of the 15th century. The temple of Aṭálah Deví, or Dewal Aṭálah, is spoken of throughout the history as having been a place of great sanctity, and it would seem that the Bráhmans on the overthrow of Buddhism had appropriated it, and making Sakhya Muni the ninth Incarnation of Vishnu, left his figures standing therein. The fact of there being such figures, many remains of which still exist, only proves that the monastery was built after the faith had become much degenerated. Fírúz Sháh granted the people a *sanad* whereby their temples were not touched, but no new temples were to be erected. Subsequently, we are told, that *naturally*, as the Muslims gained power, they converted it into a mosque, and it became the state place of prayer; but subsequently falling into disrepair, it was never restored.

This, remember, was written by Muḥammadans who could have no possible object in misrepresentation, and who, if it were so, would certainly claim the mosque as an original erection.

When most carefully examined by me, I found no traces of statues of any other than Buddhist, *i. e.* Sakhya, at the Aṭálah, although some others were found built into the other mosque. In the basement niches there would appear to have been cut in relief bells supported by chains or twisted rope. This is a well known form of ancient Hindú ornamentation, and the cloisters at the Qutb near Dhlí, which Cunningham so clearly shews to have been constructed of Hindú temple pillars, are covered with them. Report for 1862-63, page xxxix.

This last named writer in one place speaks of the apparent conversion of these bells most ingeniously into seal and stands with a Muḥammadan inscription upon them, and this would appear to have been done at the Aṭálah, notably in the vestry room, converted by them into a room for their women who entered by a private door and staircase, and they then appear to have cut upon the said seals their profession of faith.

Again, the brackets within the courtyard which supported the eaves of the upper cloister have originally been animals. Their forms have been defaced, but it cannot be concealed, and surely no Muslim ever put these up. Throughout the three mosques at Jaunpúr there are built into the restored or altered parts, such as the gateways, and domes, very many defaced Hindú figures, chiefly Buddhist, built face inwards into the masonry, all shewing most plainly whence the materials were obtained.

The Maháwanso tells us that the pulpit in Buddhistical Viháras always faced the East, and that the principal door faced the East also. Hence the direction of Makkah was already arranged for.

The great porch of the Jaunpúr mosques may be entirely of Muhammadan construction; but the principle of the arrangement of the doorway is very ancient Hindú, whereby the light enters from over the high door and falls at a certain hour on the figure of Sákhyá, which was always placed upon a 'singhásan,' or throne, facing due East.

The cloisters around appear to be much as they ever were, excepting that they have been constantly repaired, and pillars here and there replaced. I have never heard of such pillars being claimed by Musalmáns; and we find the same at the rock cave temple in Bihár, whilst the cruciform capitals are as ancient as any form of Indian architecture that I know of.

The centre gateways are manifestly inserted, and although ancient materials have been used, the work is Muslim. Here any unprejudiced person can see at a glance how the ancient work has been overlapped and built in. He has only to look at the columns and at the ground basement moulding running under the very steps. This basement moulding appeared to Mr. Sherring and myself to be part of the original building, and here I may remark that the Muhammadans, when preparing a mosque, never cared to disturb the good old foundations or the basement moulding. They built on whatever they found that suited their purpose, and hence we find mere ancient substructures.

In General Cunningham's Report for 1862-63, para. 261, p. 23, he says, speaking of remains at Kanauj—"On comparing, therefore, this cloistered Masjid (the Sita-ka-Rasui) with those of Jaunpúr, *which are acknowledged rearrangements* of Hindú materials, we see at once that.....are not Muhammadan. *Vide* also para. 264, which applies still closer to Jaunpúr.

As doubtless the masons employed by the Muslims were Hindús, any mason marks made by them during the rearrangements would prove nothing. They are not therefore quoted in this place. Some were published by me in the 'Builder,' of June 26th, 1869.

The cloister pillars also shew beneath the new work of the porch, which is scaling off and falling down.

The whole country in this neighbourhood was formerly covered with ancient temples, and we found in the foundation under the front gateway

of the Lál Darwázah a Hindú pillar carved over with chains and bells. The fact that Jaunpúr, under some other name, is not mentioned by the Chinese travellers is not surprising ; for, as I said before, the whole country is covered with the remains of such buildings, and they had enough to see and describe without going out of their way.

Before leaving these interesting buildings, I would wish to remark a curious coincidence. The "Sita-ka-Rasui" at Kanauj is quoted by Mr. Fergusson from Cunningham's Report as having been *rearranged* from a Jain temple by the very Ibráhím Sháh of Jaunpúr in 1406, A. D., *i. e.* just the same time as that assigned by that gentleman (*viz.*, A. D. 1419) for the *erection* of the Jaunpúr mosque by Ibráhím Sh.h. The inference is very clear. He says that they were commenced at this time, and finished by Husain, 1451-78.

In all this, I do not deny that the Muslims may have copied ancient patterns in carving, as is notably seen in old cloisters in the Fort at Raj-ghát, Banáras, the adaptation of which has never been disputed, and they certainly used carved stones found on or near the spot for their new work. Mr. Fergusson writes to me that our difference of opinion is not one of degree, it is absolute ; " I deny in toto that these mosques are built on Bud-dhist sites, or that their details are Buddhist, or even copied from Buddhist " buildings."

The closed cells under the courts are not wanting, and are visible in a marked degree under the Mosque of Aurungzeb in the centre of Banáras, where all may see them.

The very many ancient carved stones found within the precincts of the mosques prove that at the best they were sites of buildings of great antiquity.

I will now say a little relative to the ruins of Bakharyá Kund and the grounds upon which we (Mr. Shering and I) assigned them the date we did, *viz.*, that of the Gupta dynasty, according to Mr. Fergusson, 300 to 400 B. C.

At Jaunpúr, I am not aware of any inscriptions having been found to fix the conversion of the mosques ; but at Bakharyá Kund we were more fortunate, and the reader will find one of the time of Fírúz Sháh, A. D. 1375, quoted by Mr. E. Thomas in his work on the Chronicles of the Pathan kings of Delhi, to shew how they *appropriated* and built upon temples which came to their hand. In fact, I may in passing remark, that I have only found one temple at Banáras which can claim date before the time of Mahmúd, the destroyer of temples. It is at Khundúa on the Pach-kosí road, and is well worthy of the visit of any passing archaeologist.

The Chinese traveller of the 7th century, Hwen Thsang, mentions many Buddhist monasteries at Banáras in his day, and states that there were thirty, to most of which were probably attached temples, and considering the massive structure of the day, I hold that some remains must exist even now. Hence Mr. Sherring and I examined well the line of country where they were

likely to be, and we reported our success in the pages of this Journal. Chief amongst these was the one at Bakharyá Kund, which Mr. Sherring brought to notice some years ago. Here we found a small mosque, the substructure of which we hold to be original ancient Hindú or Buddhist work. There were also many terraces, girt at their base with massive mouldings, breast works built up of large cut stones, low cloisters constructed of old square columns, and foundations built of huge brick and very many feet in thickness (10 to 30 ft.). Over the ground were scattered carved stones, broken statues, kulsis or top stones, 9 feet in diameter, with many other remains. Below these basement mouldings or blocks of stones, squared on three sides and rough internally, which had been laid bare by the weather, were many incised inscriptions in the Gupta character. A few of these have been collected on the accompanying plate, and these have principally, but not wholly, been copied from stones 'in situ.' This is one of the principal grounds of our opinion, which was not hastily formed. The inscriptions were kindly translated for me by my learned friend Bábu Rájendralála Mitra.

The small mosque is a very curious one of conversion, if it be one. The ground plan is not that of a mosque at all, but of an Indian temple. It is a square with a square projected on each face. On that facing the East, however, the projection has not been carried out, but instead an enormous stone has been let in as a base for the singhásan on which was to stand the figure of Sákhyá. From the base arise pillars, severe in character, square as all the ancient Hindú pillars were in this part of the country, whilst above the Muslims have put on a dome. It has been figured in our account in the J. A. S. for 1866, and even struck J. Prinsep who lithographed it in his views of Banáras. The massiveness of the pillars, which are built up of single stones without mortar, has ensured permanence.

Other remains near are held by us to be of equal antiquity. These have been preserved by being used as tombs for the burial of great men or of saints. With the wealth of material lying about, the Muslims of Banáras appear seldom to have built a tomb, but at Jaunpúr there are most elegant mausoleums in which little or no Hindú materials have been employed.

The strange way in which pillars have been used as architraves at Bakharyá Kund is very singular, but the height of absurdity was at Sayyidpúr Bhitari, a great Buddhist site, where I saw a linga put up for a Muhammadan head stone at a grave, with a little niche for the lamp cut in it, and this linga had been carved out of a Buddhist column. After this, one can wonder at no amount of conversion or alteration by the Muslims.

I trust that in the above notes I have shewn some ground for the views I hold in regard to the buildings, the date of which is under discussion, and I would beg to refer the reader to the ample details in this Journal for 1868.

Studies in the Grammar of Ohand Bardāi.—By JOHN BEAMES, B. C. S., &c.

As the first fasciculus of the text of this ancient poet has now been published, it may be hoped that scholars in various parts of India will begin to co-operate with those few persons who have hitherto had access to the MSS. in elucidating the mysteries of his crabbed and archaic style. The time seems opportune, therefore, for collecting such observations as I have been able to make from time to time on the grammatical peculiarities which Chand's language exhibits. I have not been able to study the whole of the vast work, indeed such a task would take up all the time of more than one student even if he were not like me much occupied with official duties; but as the style, even in its irregularities, seems to be uniform throughout, notes on those books which have been examined, will probably be found applicable to the rest. The illustrations hereinafter given are taken chiefly from the 1st book as it is now in print. The 19th, 64th and 65th books, have also been cited. There are, moreover, several quotations from various parts of the first eighteen books, and one or two from the 21st, the celebrated Mahoba Khaṇḍ.

By way of getting at a sound working basis, it is necessary first to clear out of the road certain obstructions partly peculiar to Chand and partly shared by him with all early Indian poets. The first of these is the uncertainty of the spelling, in respect of vowels, we find the same word written at one time with a long vowel, at another with a short one; vowels are inserted or omitted at will, and diphthongs are written in two or three different ways. In respect of consonants, arbitrary insertions or omissions occur, double consonants are written as single, and single as double, aspirates are deprived of their aspiration, and unaspirated letters are aspirated at will. The following examples may be taken:

a. Vowels. गारि and गारी; वात, वत, वन and वत, वकाश and वाकाश; वेहि and वेही; रिष, रिषि, रिष and रिषी (चषि); निर and निरि; पुष, पूषा, and पूष; दनाय for दात or दन; सेह, सयह, सरह, सेहह (सैह); जौ, जय, and जवन; जैरि, जैरी, जहरि, and जवरी; नगर, नयर, नर and नेर; मुकु, मुकौ and मुकी; मुखियो and मुखो; मनुष, मानुष, मानष and मनष; सैति, सैती, सैति and सैत; जै, जय, जर and जवा; विनखुषा and विनाखा; रक, रक, रकह, रकि and रक, रो, रुर and रोष.

b. Consonants. वडकर, and वोकर; वही, वमि, वानि and वान; जौ, and जौ; वीष and वीष; कारज and काज also कजह; विष and विष; वैष and नष; ववरिज and ववरज; मुष, मुरष, and मुर; पुष and पुत; कौ, कक, कक कात; चरह, चत, and चात; चाप वीचाप; and म्यान विमान, and अकल, अकल, and वात; जन, सय and मनष; विष, मिष, and सिष; सय, सय and सय; जै, जय and मरह; वरपूत, and वरपूत, and वरपूत; with many others.

Two explanations suggest themselves for this state of things. In the case of alterations which affect the metrical quantity of the syllable, we may suspect that they had been made *metri causâ*, as is customary in Hindî poetry; and in those which do not affect the quantity, we can often see various forms of the same word in successive stages of phonetic corruption.

But those two explanations do not account for every change, nor is all yet explained, even if we add the ignorance or carelessness of copyists. Moreover, we are led to be very shy about using the *metri causâ* argument from observing the extreme laxity of the poet in this respect. Looking at his metres simply according to the name they bear, we may divide them into three classes:

1st. Those identical with Sanskrit metres.

2nd. Those peculiar to the poet.

3rd. Those identical with modern metres.

Leaving out the second as indeterminable at present, if we take the first and third we find that by no process can we make them scan. We may indulge to the full in the liberty of inserting or omitting the unwritten short *a*, we may pronounce diphthongs as one, two, or three syllables, but not even thus can some of the lines be brought to accord with the scale. Sometimes ten lines will scan quite accurately, and the eleventh be all wrong. The bards of the present day call Chand's style the '*dingal bhâkhâ*,' as contrasted with '*pingal bhâkhâ*,' or verse constructed according to strict rules of prosody. It must be remembered that many of these poems were *impromptu* productions, and most, if not all, were written to be sung, and any deficiency of syllables could be covered by prolonging one sound over two or three notes, as often happens in English songs, or on the other hand two or more syllables could be sung to one note as in our chanting. Where so much license exists, we cannot use the metrical argument except with great caution.*

We are, therefore, driven back to the conclusion that in Chand's time the form of words and their pronunciation was extremely unfixed. This is probable from historical considerations also; and the use of the conclusion itself to us in our present enquiry is that it removes out of the way the necessity of attempting to establish a fixed set of forms for words and inflexions. We take all Chand's words for the present as they stand, we take each word in four or five different forms if need be, and do not trouble ourselves to find out which is the right form for Chand's period, simply because we do not believe there *was* any right form, any one form, that is, more used and more generally accepted than any other. In fact, we

* Since writing the above, I have been informed by Dr. Hoernle that he does not find Chand's metres so irregular as the bards report, but the learned professor allows himself to alter the spelling of the text to bring the words into agreement with the metres, a practice which seems somewhat premature.

recognize the thoroughly transitional character of the language we have to deal with.

The second obstruction to be removed is that of texts ; so far as I have seen, the MSS. at present available, some five in all, have all been copied from the same original text, and servilely repeat the old mistakes. Where they differ from one another, we can generally detect merely an additional error of the copyist. It is not necessary therefore to enter upon a detailed collation of texts, such a process would not lead to our finding out or establishing one settled and correct reading. Sometimes for thousands of lines together, there is not the divergence of a single letter between the whole five MSS., the same obvious errors being faithfully repeated by all. Historically the Baidla MS. has the best right to be considered the representative of the original text. Tod's and Caulfield's MSS. belonging to the Royal Asiatic Society, were made for the officers whose names they bear in the second decade of the present century, as stated in the colophon to each, though it is not stated from what older MS. they were copied. The Bodleian has no colophon, but agrees, as far as I was able to compare it, with Tod's. The Agra which is the worst, and most carelessly written of all, is also from the same origin, with a great many extra blunders of its own. I do not know from what source the translations lately printed in the 'Indian Antiquary' are derived, but from the absence of proper arrangement and the scanty nature of many of the extracts, it is probable that the MS. was not a perfect one. As to the many imperfect scraps which may be found here and there in the libraries of native princes, they are so fragmentary and so interspersed with matter which Chand never wrote, and their language has often been so obviously modernized, that it will be wiser to disregard them altogether, classing them under the head of "pseudo-Chand fragments," and sticking to the few complete copies which are accessible. For working purposes, Dr. Hoernle and myself are taking Tod's as our basis, occasionally assisted by the Baidla and Agra. Caulfield's and the Bodleian being locked up in English libraries cannot be used.

Taking then the work as it stands, and not troubling ourselves in our present initiatory stage with either spelling or text, the following notes may be found useful to start with, though many of them may have to be modified as we learn more about our subject. For it must be steadily borne in mind that we are only at the beginning of the battle, and have no predecessors in the field, of whose labours we can avail ourselves. Everything hereinafter stated, is therefore tentative, and, *pro hac vice* only, dogmatizing would be premature. Moreover, Chand is the earliest poet in the language, and we can therefore illustrate him only by his successors ; his relations to those who went before him are absolutely indeterminable for the present, and will probably long remain obscure.

The pronoun as the oldest and most characteristic part of the language may be taken first. The forms observable approach very closely to those in use in all the Hindi poets down to a late date, the pronoun being peculiarly tenacious of its ancient forms.

Both in the noun and pronoun, the synthetical process has been to a great extent rejected, while the analytical is as yet in an imperfect state of development. Thus, three states or forms of the singular, and three of the plural, may be detected in the pronoun: first, the direct or simple form, used for the nominative: second, the oblique, used for all cases, sometimes with the addition of post-positions as *बौ*, *बौं*, *ने*, *सब*, etc., but more often without any distinguishing mark: thirdly, a special form for the genitive.

The pronouns of the first, second, and third persons are exactly parallel, the first being modifications of a theme *mo*, the second of *to*, and the third of *tā* (*yā* and *vā*).

It will perhaps be useful in a little known author like Chhand to give rather copious illustrations of each form first, and then to tabulate the results at the end.

The commonest form for the nominative of the first person is *बौ*. This is derived from the Skr. *वचन्* by rejection of the *व* and resolution of the final *m* into its compound elements, as in *गव = वचन* (see my Comp. Gram., Vol. I, p. 254). One example may suffice for this very frequent form.

नौ बौ बचा दे ॥

Then I quit the body (*i. e.*, kill myself) I. 157. 2.*

Differing only by the omission of one of the top strokes and therefore to be regarded more as a variation in writing than as a separate form is *बौं*, as

बौं बौं सब सुनत बौं मात ॥

I am (constantly) hearing all that, O mother. I. 160. 4.

बौं जानि ग्यान दूख कबौ तोहि ॥

I knowing science tell this to thee. III. 27. 50.

The form *बै* often written *बे* and so hardly to be distinguished from the post-position 'in,' occurs in a few passages, as

बै सुन्या चाहि विन बिनि कीन

नहि जोन जोन बै नय कीन ॥

I heard the Shah had deprived (him) of eyes.

Abandoning food I practised austerities and penance. LXV. 110, 17-18

In these lines, and wherever else it occurs, *बै* is used before the past tense of an active verb, showing that it was still regarded as an instrumental, as it is by origin from the instr. of Sanskr. *वचा*, Prak. *वर* and *वर*. Chhand I believe wrote simply *बै*, as in Marathi *बो*; the *anunāsikā* is a modern

* The Roman numeral indicates the Book of Chhand's poem, the first Arabic numeral, the canto or poem (Kavitt), the second the line. The numbering follows my list in J. A. S. B., Vol. xii, p. 204.

addition, so is the use of **मैं** as a nominative, and the modern fashion of saying **मैं ने** is founded upon ignorance of the true nature of the word and contains the instrumental twice over.

For **मोहि**, commonest of the oblique forms, innumerable examples may be found. Two may suffice, as the form is also in use in mediæval Hindi, down to the seventeenth century at least.

कह्यो मोहिनि वर मोहि ॥ I. 192. 2.

The lord of Mohini (Durgā) hath said to me.

नहीं मोहि काम पिता राजघान ॥ LXIV, 360. 9.

There is no business for me in my father's palace.

(*i. e.*, What have I to do with it?)

It is apparently Chand's idea of metre, for he has some ideas on the subject, that leads him to shorten this form constantly into **मुहि**, as :

जो मुहि डुंढा निगछिहै. I, 170. 2.

If Dhundha shall swallow me.

तब लगि कह द्रिद्र तन ॥

तब लगि लघु मुहि गान ॥

जब लगि रौं बाधो नदी ॥ तो पार न सेवान ॥ I. 276. 1-4.

Till then pain and poverty (were in my) body.

Till then my limbs were light ; (*i. e.*, mean, contemptible).

As long as I came not (to thee),

And worshipped at thy feet.

The final short *i* is sometimes omitted, as

मुह सुझै रह मत ॥ I. 179. 2.

'This opinion seems (right) to me.

Commoner than any except *mohi* is the form **मो**, used for all cases, sometimes with, but oftener without, post-positions, as

किस उधार मो पोर ॥ I. 188. 11.

How shall there be salvation for me.

जिहि हतौ चप मो तान गर ॥ I. 49. 9.

He who killed the snake (on) my father's neck.

भट् जाति कविधन नृपति ॥ } VI. 18. 1-2.

बाध नाम मो चन्द ॥

Bhat by caste, king of poets.

Lord! my name (is) Chand.

पैरी कहि मो कजं हर पारु ॥ I. 160. 1.

Having thus said for me you find fear.

(*i. e.*, You put fear into mind).

जो मो सो साच न कहौ ॥ I. 157. 1.

If you do not speak the truth to me.

Instances of the form **मुह** are also frequent.

इह धरणी मुझ पित परपित ॥ I. 279. 1.

This land (was) my father's and my ancestors'.

का किहि वंसहि उपज्या ॥

तू मुझ जंपहि मारै ॥ I. 147. 3, 4.

Who (am I), from what race sprung

Tell thou to me, O mother.

Instances of मेरे are as follows :

मेरे कहूरै दास न आवड ॥ I. 160. 2.

You have no pity on me.

(Lit. Of me any pity not comes.)

सत भात मेरे बने ॥

Seven brothers of mine are slain. V. 61. 3.

इह मेरो बरदासि ॥ (i. e. عرضداشت).

This is my petition. I. 228. 2.

For the nominative plural हम is universal ;

हम तुम कबड नहि विवड ॥

We (and) you had never strife, I. 210. 29.

हम तुम काम रहि बेत आज ॥

We and you (have) business (on) this field to-day. 1b. 31.

The oblique form is हमहि and the genitive हमारो •रे •री.

आवहा तुमो हमारी बानीय ॥

Alhá, hear my word. XXI. 145. 2.

The nom. is used when we must translate by a genitive or other oblique case, as in हम मरण दिवस, the day of the death of me. I. 210. 27. It is a nom. again in

कहे कन्ह हम मानी सचच ॥

Quoth Kanh, honorable (are) we all. VI. 52. 1.

The post-positions are affixed as in the modern language हम सो, etc.

For the second person the singular nom. तू has been quoted above, as also the plural nom. तुम; the former has an emphatic form as in the hymn to Bhavani—

तुंही मह मोदावरी गोमतीयं ॥

तुंही नर्बदा जमना सरस्वतीयं ॥

Thou art Gangâ Godâvari, Gomati,

Thou, Narbadâ, Jamunâ, Saraswati. LXV. 16.

And so on through some forty lines. In the following, however, we have the oblique form : the only difference is the absence of the *anunâsikâ*. The *i* is lengthened metri gratiâ ;

सबै कज्ज सबै ॥ तुंही नाम सबै ॥

Before all affairs. Thy name is affixed.

Hymn to Ganesha, I. 26. 26.

ॐ — । — ॐ । — — ॥ ॐ — । — ॐ । — — ॥

Sabai Kajja aggai tuhi náma laggai,

The regular form for the oblique is, as might be expected, तोहि ; तुह सभू तोहि ॥ I. 192. 4.

Sambhū is pleased with thee (तूढे = तुह).

Shortened to तुहि, as in जदि न आप तुहि भयो ॥ I. 60. 1.

If there were not a curse on thee.

Or to तो, as

सुनिय बात तो तान ॥ I. 250. 1.

Hearing (this) word, thy father.

Parallel to the first person, occurs तुभा, अबन सनाउं तुभा ॥ Let me tell the tale to thee. LXV. 314.

There is also the Prakritic form तुष in तुष पुत्र पौत्र बधू उरनं ॥ Thy sons and grandsons from the wombs of thy wives. I. 280. 3., and तुष भुज बल अचिरज कर ॥ Say that the strength of thy arm is wonderful. LXV. 325. 3:

The oblique form of the plural is तुमहि, and of constant occurrence.

पुत्र एक जखन तुमहि ॥

I ask one son of thee. I. 88. 3.

कै सिर तुमहि समझौं ॥

कै सिर धरिहौं हव ॥

Either I will yield my head to thee,

Or I will put the umbrella over my head. I. 279. 3, 4.

(i. e., I will conquer thee, or die,)

The post-positions are used with तुम, as तुम को, तुम सौ, etc.

For the third person we have a definite personal pronoun सो, as well as the two demonstratives इह and उह = this, that, with their respective formations.

इह 'this' is found repeatedly सोहि इह बागन भुजौ ॥ To me this future appears clear. I. 28. 2.

The oblique form is याहि, याहि सम्पूर्ण को धिर काजं ॥ To complete this (is) a work determined on. I. 87. 6.

I am disposed to see a shortened form in the line

इह य (या) चित सो चित ॥

This was his thought and my thought. I. 251. 4.

Both the nom. plural of उह and an emphatic singular of इह are contrasted in the following :

वे बाहै तरवारि ॥ इहै मुख पकरि हू कहे ॥

They ply their swords, He catching (them) in his mouth breaks (them). I. 254. 5, 6.

In order not to prolong this section too far, I will now merely give the

scheme of the pronouns as far as I have found them, or can construct them from analogy. The latter are in brackets.

1st Person.	2nd Person.
Sing. Nom. मैं, मैं	तू, तूहि
Oblique मेहि, मुहि, मो, मुझ, मुह	तोहि, तुहि, तो, तुझ
Genitive मे, and मेरी •री •रे	तुह, तो, तेरी •री •रे.
Plur. Nom. हम	तुम occasionally in Gāthā तुमं
Oblique हमहि	• तुमहि
Genitive हमारै	[तुम्हारा] तुम्हारे •री
3rd Person.	
Sing. Nom. वो. he	इह this इहै उह that उहै. वह
Obl. ताहि, ता	याहि, या बाहि. बा
Gen. ता कौ etc.	याकौ etc. बाकौ etc.
Pl. Nom. ते तेउ	वे इहै न
Obl. तिनि, तिनै, तिन	इनि. इन [उनि] उन.
Gen. तिन कौ	इन कौ [उनकौ]

ताहि is shortened into **तिही**, and thus corresponds with **जिहि** (pl. **जिनि** and **जिनै**) from **जौ**.

The interrogative is **को** or **कौ**, oblique **किहि**, pl. **किन**. Of other forms may be cited **कितनौ** and its series, also **कैसे** and its series shortened at times to **किसो, जिसो** etc. A curious double form occurs in the lines

जाके देख न होई ॥

ताहि कैसे कें गहिचै ॥

He of whom there is no body,

Him in what way can one catch ? I. 161. 8.

I suspect **कैं** here to be a relic of the verb *kar*, as in the same passage occurs the phrase

जिहां दिह नह भिद् ॥

ताहां कैसे करि सुनै ॥

Where the sight does not penetrate

There in what way can one see ? *ib.* 4.

It would mean in full 'how having done? in what manner having acted.' The oblique form of the plural is used adverbially for 'how?,' and takes anuswāra as in the first of the two last quoted instances. In the following it stands alone—

साराङ दे कैसे जुष कीना ॥ I. 154. 4.

How did Sārang De make war ?

For **कितना** and its series we have also **कतेनौ** and the rest.

कतेन गर रिष रारै ॥

गर गुर दामन खये ॥ I. 162. 3-4.

How many men, and Rājārshis,

Have there been (and) gods and demons of you.

Chand's noun is rather a formless affair, as might have been expected, not only from the age in which he wrote, but from the style common to all those most obscure and difficult of writers, the Hindi poets. Like them, he loves to string together crude nouns, and leaves the reader to construct sentences out of them by mentally supplying the needful case-signs. This he does not merely in his rhapsodies where perhaps no very definite meaning is to be expected, but even in his narrative portions. Thus in the very first stanza

थिर चर जङ्गल जीव चन्दनमयं
(Literally) Firm. Going Living being. Life. Possessing qualities of sandal-wood.

All which may be put together into a sentence as the reader likes ; or again—

कल बरनि बरनि सु कन्द.
Kali (yuga). Heroes. Heroes. Well. Strife.
नृपराज हुज गल बनि
King. Brahmin. Neck. Bind.

Other instances afford a clue by some verbal form, or by the context ; as

सब जन सोच उष्यनो ॥

To all men anxiety arose. I. 149. 2.

for सब जननि कौ ;

सेव बड् इव उपायन ॥

By service much wealth is gained. I. 262. 8.

which may be rendered in Mod. Hindi thus सेव से बड्कत इव का उपायन होता है.

दरबार ताल बधि भरि बरि ॥

The darbar became like a tank full of blood as water. V. 37. 1.

In full thus—दरबार ताल जैसा झरवा बधिरे से भरा झरवा जैसा पानी से.

The case-signs, however, are fully and freely used when the metre allows, and I shall now give instances of their use, exhibiting the more ancient as well as the transitional forms, and those which are identical in form with the modern post-position.

The objective case, including both dative and accusative, is indicated by the preposition, concerning whose origin I reserve my opinion for the present, कउं.* Variant forms are कउं, कौ, को, from the last of which by dropping the anuswara comes the modern को.

जयै तु सोई तुन एक कउं ॥

He seeks one of you. I. 88. 9.

* Provisionally, Trumpp's theory of the origin of this form from कउं, resulting from कउं by aspiration of the त owing to elision of the र, may be accepted, but there are difficulties even in this theory. (See his Sindhi Gram p. 115). Caldwell's connection of this form with the Dravidian ku (kku) must in any case be regarded as finally exploded and no longer tenable.

प्रातः समे परं बुज्ज कज्जं ॥

वण्डि वण्ण कर दीन ॥

At morning time the hero to Brahmans

Dividing with his own hand gave (gifts) VII. 5. 3-4.

करि दंडीत सबन कज्जं ॥

Having made obeisance to all. VI. 88. 2.

Another instance was quoted a while back under *सो*. The *u* is lengthened *metri gratiā* in

प्रिथीराज सौमिन युव कज्जं ॥ सम परिमाल बुलार इव ॥

For the war with Prithirāj at Mahobā Parimāl has summoned us, XXI. 84. 6.

The other forms are too common to need quotation.

Under the head of ablative, come several post-positions. *सम* is the older form from which come the forms *सो*, *सो* and *से*; thus—

कहे कृत प्रथिराज सम ॥

Says the messenger to Prithirāj. XIII. 16. 1.

In Mod. Hindi, verbs of speaking take *से*; the original meaning of which is shown by its derivation from *सम* to be 'with,' though in modern times often used in the sense of 'from;' for which latter the proper word is *ते* or *से* to be noticed presently. Instances of *सो* occur frequently, one has been given above, another one of *सम* is *कहे कति सम कंत*, 'says the wife to her husband,' I. 7. 1., where *सम* precedes the noun; as it stands we should understand it to mean 'says the husband to the wife,' there is, however, no doubt from the context that it is Chand's wife who speaks to him, not he to her. The use of the particle before the noun, shews that it had not yet thoroughly sunk into a post-position, but is still used as a conjunction, as in Sanskrit.

परि with forms *पर*, *से*, and *से* is used as in ordinary old Hindi.

ते, mostly with abnormal anuswar *ते*, is I take it from *सो*, (just as *से* from *सो* or *सो*) a regular ablative termination in Prakrit, from the Sanskrit adverbial ablative in *तच्च*, as *पामतच्च*, from a village, though it has become severed from the noun and is treated as a post-position. Instances are

ता के कुल ते उष्यो ॥

From his race sprung. I. 164. 1.

तुम कहे कबं जीव ते वध ॥

Say ye, (and) I make him destroyed from life. I. 178. 21.

(i. e., If you give the order, I will kill him.)

For the locative, we find the many-formed post-position represented in modern times by *ते*. In its earliest form it is *तथे*, then dropping the *o*, *तथ*,

अमृत सु मत मथ वधि ॥

Immortal dwelling among mortal. I. 8. 8.

रच बोलि बानी दल मध चायो ॥

Having spoken this speech, he came amongst the army. XXI.
10. 17.

Next comes the solution of the semivowel into its vowel, giving मधि,

चमार-सु तीन परे घर मधि ॥

Thousands three fell on earth. XXI. 7. 59.

Sometimes written मेधि, when a long syllable is required,

जोगिनीय मई रागिनी मधि ॥

The witch went among the queens. I. 178. 9.

(रागिनी for राक्षी like अगियान for अज्ञान and आग्या for आज्ञा)

The natural transition from च + य into ज्ञ (see my Comp. Grammar, p. 326.) gives the form मज्ञि—

मुझेव परिय मज्ञि विल अथाव ॥

Fell headlong into the bottomless pit. I. 79. 10.

(मुझेव a form of 3 sing. pret. for मुझ्यो from मोच and therefore meaning “was set free,” in combination with परना = पडना ‘to fall,’ it means ‘was set free falling,’ i. e., ‘fell unrestrainedly or headlong.’)

Final short vowels are of very little account in Hindi, and are omitted or inserted at will. Thus forms मंज्ञि and मञ्ज्ञि, with inorganic anuswāra, and in the former with lengthening of the vowel, occur.

उपवाग मंज्ञि बलि गये आप ॥

They themselves went into the garden. XXI. 5. 6.

(उपवाग a curious combination of उप with باغ, after the fashion of उपवन).

को राजन कवन घर मञ्ज्ञं ॥

What king, in what land? XXVI. 18. 4.

The metro is Gatha which accounts for the Sanskritisms. Chand always puts an anuswara to the last syllable of his words when writing Gatha, he seems to be under the impression that by so doing, he is making them into Sanskrit! In the next line we get

परवर उजेन मञ्ज्ञं ॥

In wealthy Ujjain.

(परवर = प्रवर abounding in wealth). I have seen also frequently मञ्ज्ञ and मंज्ञ, but have lost the references to them in my notes. A lengthened or secondary form मञ्जार is also in use with the more definite meaning of “in the midst of.”

नर नारी लज्जा मई ॥

मानुष नाच मञ्जार ॥

Men and women cast aside shame

In the midst of the month of Phagun. XXIII. 1. 4.

Alluding to the Holi festival.

हो वरि वर पड्यो मञ्जार ॥ (वर = شهر, and वरि = خبر).

Having received the news she arrived in the midst of the city. I. 178. 4.

हरि मजि मये गिर बन मझार

The enemy fled into the hills and forests. I. 206. 38.

A step further brings to the rejection of the organia portion of the aspirated letter, leaving only ह, we thus account for the form महि, which is extremely common.

ककाल महि कलूरी ॥

रानी रेहंत मयन झुझारं ॥

Putting musk into lamp black

The queen streaks her eyes for ornament. (Gātha) I. 20. 1.

(रेहंत from रेजा, line).

दिन सत खवधि अंतर बडत ॥

हरि तु उदरै दिनक महि ॥

A period of seven days is ample time,

Hari can save in a single instant. I. 60. 12.

The post-position is here affixed to the genitive as indicated by क, see further on under that case.

झारखंड महि चरत ॥

Grazing in Jharkhand. I. 61. 3.

It is lengthened to माही—

देखति खपति बनि नीदा माही ॥

Seeing the king sitting in sleep. I. 191. 4.

सग्यो धीर जलहन पैया धर मांही ॥

The hero Jalhan was smitten and fell on the ground. XXI.

264. 20.

And if I am right in my translation, still further to मांही—

पिय रन मांहीं मरे ॥

माही सती न होय ॥

(If her) husband die in battle,

The wife does not become a *Sati*. XXI. 175. 1.

Lastly, we have the ordinary modern form में, the anuswara of which is, as so often the case in Hindi, a mere inorganic accretion.

पिय हि मरत पिया रहै । करै पुत्र को आय ॥

बच माही निहचै करै । बडे मरक में बाच ॥

The wife who survives when her husband dies, and hopes for progeny,

That woman certainly makes her abode in the great hell.

XXI. 174.

I suspect the whole of this verse to be a modern interpolation. The style and versification are too regular for Chand, and the sentiment is

repeated from the preceding lines which are more rugged and Chandesque

मिहचै वेद नरक ताहि भाषै ॥

पिय कौ सरत बिया तन राषै ॥

ने is, however, found in many passages where there is no reason for suspicion.

एक मास में नगर बसायो ॥

In one month he established a city. I. 218. 3.

बली कन्ह कै कंध में बसा नायो ॥

He brought down his sword on the shoulder of strong Kanh.

XXI. 264. 24.

Of the instrumental case indicated by ने as we have it in modern times, I cannot point to any clear instance. When we come to treat of the verb, the construction involving this case will be illustrated.

There remains only the genitive, and this is indicated by the particles कौ, के or कै, and की, as in ordinary Hindi. Sometimes shortened to क as in one instance quoted above. Two passages may be noted in which the older form करै, करी, which has been recently brought to light by Dr. Hoernle, seems to be found. The first is that in the nineteenth (now 20th) book, in which I formerly saw a pret. of a verb करना. This view must now be given up, and the passage translated differently; it is a very obscure passage, however, and I now only give a tentative rendering. It is the rout of Shihábuddín's army by Prithiráj.

दौरे मज खंखं चाऊवान करै ॥

करीयं मिरदन बिही चक्क फेरै ॥

Blind (from flowing of blood) ran the elephant of the Chauhán,
Making a circle he surrounded on all four sides. XX. 141. 7-8.

The other passage is at the meeting of the armies before Mahobá.

कियो नद नीधान फोखें दुफेरी ॥

भिदो दिदि सौ दिदि चाऊवान करै ॥XXI. 29. 9-10.

फोखें in Chand and in other bards, though plural in form, is always treated as a feminine singular.

The kettle drum made a noise, the army turned,

The sight of the Chauhan was separated from view.

That is, the two armies lost sight of each other, probably from the dust they raised. It will be observed that करै in the first quotation agrees with the masc. मज, and करी in the second with the fem. दूहि, so that we have so far confirmation of Dr. Hoernle's theory. I have traced forms करै and करी, as well as कर, in the cognate languages. From the vast ocean of Chand fresh examples will probably be fished up, as we get to know more about it; at present I have only these two instances in my note book.

With regard to the modification of the base in nouns nothing noticeable is to be found, except that Chand occasionally uses the nom. or direct form of bases in *d* before the post-position, as

राज आर डेरा सधि॥

The king came into his tent. I. 193. 2.

Where we should expect डेरे; and again

निधि बेरा आये कहे । डेरा साहि पनम॥

At that time came somehow into the tent a snake. I. 243 4.

Instances of this practice may be found in Tulsi Das and later poets, and in the tika to the Bhaktamala, and it is universal in Bengali.

There is a curious word in two or three forms, as usual with Chand's words, about which there is some obscurity. It is ऊँतो or ऊँत and must, it appears to me, be translated "from;" though it looks at times like an imperfect of the verb हो, in which case I take it to be one step in the process by which we get to आ, which will be noticed under the verb. I give the examples I have noted. In the first, Bisal De is asking his minister about the shrine of Gokaran which he wishes to visit.

कोतीक दूर आजमेर ऊँत ॥

दिन दोय सभ कोकी पऊँत ॥

How ~~far~~ (is it) from Ajmer ?

In two days easily one arrives. I. 178, 47.

Here, by the bye, is सभ which I wanted a while ago. When Bisal gets to Gokaran he meets a Siddha who asks him where he comes from.

कहत सिध किछि पुर ऊँतो ॥

कोन मोत किछि नाम ॥

इहि तोरण आये ऊँते ॥

कै आने कोई काम. I. 184.

Saith the Sidha *from* what city,

What family, what name ?

Had you come here on pilgrimage,

Or (have you) further on any business ?

In the first line ऊँतो must be "from," but in the third line ऊँते is pl. of ऊँतो, = आ. In the next passage the doubt is still greater, and the whole passage is a peculiarly crabbed one.

इनि वनूपास्य हँद ॥

कह वरनि वरनि सु कह ॥

अधि नाह पिंसह जोर ॥

हुज ऊँतो हुजनिज जोर ॥ I. 48. 1-4.

Here begins the Hanūphāl metre.

In the Kali (Yug) heroes (had with) heroes strife,

Not together harmony or union,

Brahmin *was* to Brahmins cruel.

ब्राह्म is still used in Panjabi for "with," मार is still Marwari मूरा 'wicked, cruel,' mod. Hindi मुरा. Now in this passage ब्रह्मो may either be "was," or we may render it "from," as "Brahmin *from* Brahmins (was) averse, or cruel." The meaning would more strictly be 'towards,' but in the mod. language से would be quite admissible. On the whole, though, I am in favour of regarding it as a verb in this passage.

In those places where it is clearly a postposition, it may still be derived from the root ब्र, and be analogous to the Bengali হোইতে, 'from,' Marathi झुन, and comes from the Prakrit ablative plural ब्रह्मा.

The plural is formed by बनि, the final इ of which is frequently omitted, and the plural itself is often represented by the singular form. The practice of confounding the two numbers is as old as Chand, and probably, for all we know, older. Plural verbs are used with singular nouns, and feminine verbs with masculine nouns and vice versa, as in the line

तब सकल भदय एकत्र नारि ॥

Then all the women were assembled together. I. 178. 1.

Where नारि is plural in sense, though singular in form, while the verb is singular.

सब गैनि कछो ॥

All the wives said. *ib.*

Here again गैनि is fem. pl. and the verb masc. sing., which arises from the instrumental construction.

कन्या कियो बंदोह ॥

The bride made lamentation. I. 171. 2.

III.

The verb is modern in form, exhibiting the birth of the analytical system, as yet weak and uncertain, but already indicating the direction of its future development.

The number of forms in use is few, and Chand seems to regard verbs as a superfluity in many instances, omitting them at will, and often substituting for all forms of the verb what I may call the verbal crude form, produced by adding a short *i* to the root. Though this form is strictly speaking that of the conjunctive participle "having done," and the like, yet there are countless passages in Chand where it will not bear this meaning, but is a present, past, or future, as the context may require. For instance in

बनल बानि मानव लियो ॥ कहि सब बात सुनार ॥

राजान बन ले ॥ भूनि बघारि जाद ॥ I. 309.

Anal *having come* met (his) mother, *having* told and recited the whole affair,

People and merchants *having* taken with (him), *having* gone colonized the land.

All the forms in *i* as *आनि, कचि, सुनाइ, जाइ* are true conjunctive participles, and the only finite verb in sense is *बसाइ*, and even that is a participle in form agreeing with the fem. noun *भूमि* and postulating the instrumental form of the agent. In modern Hindi we should have *जनल ने भूमि बसाइ*. On the other hand, however, we find the form in short *इ* requiring a finite sense in the following :

चिर संछि जवर बोमल गरिंद ॥

Bisal the king arrays the umbrella over his head. I. 166. 1.

If we translate *संछि* "having arrayed," the sentence will be incomplete as there is no finite verb following. The explanation of this use of the *इ* form is probably that it is a shortening of the *ए* of the 3 pers., and in this place it would stand for *मछे*. The simple indef. present is the same in all the modern Aryan languages, and in Chand presents no peculiarities.

Singular.

1. करै, कच
2. करै
3. करे

Plural.

- करै
- करै
- करै

It is unnecessary to quote examples for the regular verb ; the irregular verbs (to use a rather unscientific term) will be noticed presently.

For the simple past the forms are participial and the same for all three persons on account of the implied or expressed instrumental construction.

Singular.

1. 2. 3. { masc. बस्यो
- { fem. बस्यो

Plural.

- बस्ये
- बस्यो
- बस्यो

In the masc. sing. the final *यो* is sometimes separated by a short *a* from the root, according to no rule apparently ; for in I. 170. 12 we find *नह्यो सिंव वर विनख्यो* ॥ 'there a lion destroyed the bridegroom,' while in the very next line it is written *सिंव विनाख्यो*. As variants of the form in *यो* constantly occur those in *एव • एव*, where the *य* has been softened to the palatal vowel and the vowel *यो* hardened to its semivowel. Thus

बच रहि रहि अनेव जाव ॥

Looking looking down wandered the cow. I. 79. 9.

In the same passage occur *सुखेव*, quoted above, and *अनेव* 'she heard' (root *कर्च*). Instances of the shorter form are

चिरि आचव बुद्धि नाव ॥

Again *Alhā* spoke in wrath. XXI. 109. 47.

Also *चडिब, चडिब*, and many others. The form in *एव* is common in Tulsi Das.

For the future where no very strong idea of futurity is implied, the indefinite present is used, as in *तौ तौ बड़ी देह*, 'then I *will* quit the body.' But the ordinary form of the future is derivable directly from the second or periphrastic future of Sanskrit, as in *अभितासि*, *अभितासि*, and in the third person postulates a non-classical form *अभितासि*, for which in Sanskrit we have only *अभिता* without the substantive verb. The forms are—

Singular.	Plural.
1. <i>अभिते</i>	<i>अभिते</i>
2. <i>अभिते</i>	<i>अभिते</i>
3. <i>अभिते</i>	<i>अभिते</i>

To be referred back to a Sanskrit series, Singular *अभितासि*, *अभितासि* [*अभितासि*]; Plural *अभितासः* *अभितासः*, [*अभितासन्ति*], but in all cases with elision of the syllable *ता*, so that we should imagine a form *अभि+अभि* *अभितासि*. The terminations rest on the excessive corruption of the feeble verb *अस्*; so that *अभि* becomes *अभि* and then, by rejection of *अ*, *भि*. The resolution of *अ* into its component parts, the labial and nasal, so frequently noticed in other instances, gives *भौ*, whence *भौ*, so that we have three words *भौ*, one from *अभितासि*, a second from *अभि*, and a third from *अस्*. As a good instance of this verb in a transitional state the Marathi forms may be adduced.

Singular.	Plural.
1. <i>आहे (अभि)</i>	<i>आहो (अभि)</i>
2. <i>आहेस (अभि)*</i>	<i>आहा (अभि)</i>
3. <i>आहे (अभि)</i>	<i>आहेत (अभि)</i>

In old Hindi also, as for instance in Kabir's Ramaini, occur the forms *आहि* 'is' and *आहिं* 'are,' from which we get *है* and *हैं* in mod. Hindi.

It would lead me too far away from my present object, which is merely to illustrate Chand's forms, were I to work out all these processes here. I content myself therefore with merely noticing them, and pass on to give examples. Of the first person we have already had the instances *समधिहो* 'I will yield,' as it were, from (*समधिनासि* fut. of the causal of *अस्* with *सन्*) and *अभिते*, 'I will place.' The third person, with which the second is identical in form, was shown in *निगलिते* 'he shall swallow,' for the first plural

रज सांवत सब जुझिहैं ॥

राज अंदेख न जाय ॥

We nobles all will fight,

That the kingdom of the Chandel may not perish. XXI,

94. 3-4.

* We must take the full ancient forms *asi*, *asmai*, *astha*, and *asanti*, instead of the more modern classical Sanskrit forms, as the letters which have been dropped in the latter are phonetically necessary to produce the Marathi, Hindi, and other words.

The infinitive or verbal noun has two forms, the abstract in *ana*, and the functional in *iba*. Of the former one instance out of many is

पुढधान तिन बंधन विचारि ॥

Having plotted to stop (*or* the stopping of) his virility
I. 178. 1.

[पुढधान = पुढधाना], and with nominal inflexion,

कियो चलन को राज ॥

He made preparation for going. XX. 28. 4.

जंग जुन आलिस जुमार ॥ (जंग = جنگ, आलिस = ظالم)

In joining battle a terrible warrior. XX. 31. 5.

The functional form is of very common use, just as it is still in Gânwâri Hindi, in Bengali, Oriya, and Gujrati.

जो विलंब करि रहै ॥

तो ताहि चनिवे को आवै ॥

If any one made delay,

Then he came to strike him. I. 198. 7.

उठि लरिबे को चायै ॥

Rising up, ran to fight. I. 254. 7.

The construction is strange, but not unknown to modern colloquial Hindi in

गारि मात सिष्ये ॥

पुत्र जानल रह सिष्य ॥

Through learning (it) from his mother Gauri

Her son Anal learnt this. I. 258. 1-2.

In modern Hindi, गौरी मा क सीखने से यह सीषा जानल क.

The imperative exhibits the ordinary forms करउ sing. and करो plural, as

जगनक भट आवै घर जाउ ॥

Bard Jagnak, now go thou home. XX. 77. 1.

Owing to the careless way in which *i* and *u* are mixed up, we have a form in *hi*—

तिन दु गवच कही कहहि ॥

Say a good word about them. I. 9. 12.

In two quotations above we have seen conversely पावउ and आवउ used as present indicatives, for पावहि and आवहि.

The present participle ends in *at*, as *हुनत*, *देवत*, and in Gatha, as well as occasionally in other metres where a long syllable is wanted, in *ant*, as in *देवत*, *कवत*. The feminine is in short *i*, as *दवति*, also of course *ई*, as *वरती*, *करती*, etc.

The conjunctive participle in *i* has already been mentioned, its original full form is in *iyai*, from the locative of the part. pret. of Skr. Thus from *चलिते* we get *चलिहै*. (See Trumpp, on *Adi Granth*, J. R. A. S., Vol. V, p.

207. I see nothing in the extracts given by Trumpp in that article to justify his assertion that the language of the Granth is not Hindi, but old Gurmukhi. It is a mistake, though common among Sikhs themselves, to apply the term Gurmukhi to the dialect of the Panjāb, instead of the variety of Devanagari in which it is written, *sed hæc obiter*.)

इति किये भूमियां धूमि यय ॥

Having subdued the rulers of the land with fire and sword.

I. 206. 26.

This is of course often also written with *e*, as *धुनिये*, whence we get another of Chand's confusions, as this form is also used for the respectful imperative, as in

इह नष्ट ग्यान धुनिये न जान ॥

This destroyed science do not listen to. I. 173. 9.

One of the principal difficulties in Chand lies in his construction; an abrupt and elliptical style is imposed on him by his rules, and he makes it worse by trying to say too much at once. So that we have often to expand four of his words into twelve English, and his transitions are so rapid from one fact to another, that we are often landed quite in the middle of a fresh set of events before we are well quit of the old ones.

The custom of constructing the past tense of transitive verbs with the instrumental of the agent with the post-position *ने*, though identical in character with the Sanskrit construction, as in *तेन ज्ञानं विलीयते*, is yet apparently in its present shape at least of modern origin. It is an obscure question what this *ने* really is. That it is not derived from the *एन* of the Sanskr. is pretty clear. *ने* the older form, sometimes written *नार्*, is a dative, and is, I believe, connected with the same root as the Marathi *नामी*, Naipali and old Bengali *नामि*, whence also Marathi *ना*, the ordinary sign of the dative. It is difficult to decide exactly what Chand's usage is in this respect. While in some cases the agent is in an oblique form, in others it is in the direct or nominative.

The modern Aryan languages know of three constructions or *prayogas*. 1. The *Karta*, or subjective, in which the verb agrees with its subject. 2. The *Karma*, or objective, in which it agrees with its object. 3. The *Bhāva*, impersonal, in which it agrees with neither. They may be thus illustrated in Latin.

Karta—ille urbem condidit.

Karma—ab illo urbs condita.

Bhāva—ab illo urbi conditum.

These three constructions are seen in their full force in that most complicated of all the languages, Marathi, with its irritating three genders and old-world rubbish of that sort. Hindi is more enlightened and simpler.

It has the subjective construction for all tenses of the intransitive verb, and for all tenses of the transitive also, except the preterite in which it admits the objective construction, as राजा ने बात सुनी, also the impersonal as राजा ने लड़की को देखा. In the former the verb agrees with the object, and in the latter is neuter and impersonal, Hindi having amalgamated the neuter with the masc., the verb has attained to the masc. form, though really neuter.

Applying the above principles to Chand, we are struck in the first instance by the absence of ने with the instrumental sense. For instance—

प्रथिराज सुनि कुंवर नें॥

आप बुझार दित ॥

Hearing it, the prince Prithirāj

.Himself invited them kindly. V. 13. 3.

Here if we are to see in this ने our modern friend, the object not being noted, but being understood as living beings, we should according to rule expect बुझाये, and the sentence would run in ordinary Hindi कुंवर ने उम्हों को बुझाया, in other words, the construction would be the impersonal one, the verb would be singular (masc.), unless it be that the verb is here put in the plural out of respect. This instance, however, seems at present quite exceptional, more usually the agent is in the oblique crude form, and both the objective and impersonal constructions are used; a good example of the former is

तिन रक्षा कीनी तु तुज ॥

He protected the Brāhmans. I. 136. 1.

Where the verb agrees with the object *rakshā*, and the agent is in the crude oblique which may be any case we like to call it; again

जिहि रचे सुरज भू सन पाताल ॥

Who arranged heaven, earth, the seven hells. I. 11. 11.

The various nouns agree with the verb रचे in the neuter pl. and the agent is again singular oblique. On the other hand, we have the direct or subjective construction in

दस बार बुझ्यो राज ॥

कुज न दियो उतर काज ॥

Ten times the king asked

The Brāhman gave no answer (in the) matter. I. 48. 23-24.

And as a remarkable instance of Chand's indifference to the subject we have in one line (I. 49. 9.) जिहि हत्यो बय 'he who killed the snake,' and the next line जो हत्यो बय, with the direct construction. It is perhaps too early to lay down rules for Chand yet, but it may be hinted that in common with many of his successors in Indian poetry, he generally uses the subjective construction when the agent is a noun, and occasionally the objective or impersonal when the agent is a pronoun, and even in that case he is careless

and quite as likely to use one as the other. As far as I have gone, I have met very few instances of the use of the post-position ने, and several of those seem doubtful.

One example is

बाल्यम इथिराज ने ॥
निशि सुपनंतर चिह्न ॥
लै जुगिनिपुरह ॥
तिलक मध्य करि दिग्ग ॥

In his youth to Prithiraj

In a dream at night (came) a sign :

Having taken Juginipur (Delhi)

He put the *tilak* (of sovereignty) on his brow. III. 3. 1-4.

Here it is clearly a dative.

With regard to the irregular verbs, or to speak more correctly, those which still retain traces of the older synthetical organization, the array of forms is rather varied. Some few well-worked verbs differ from their fellows in this respect that, whereas the latter have taken from the Sanskr. or Prakr. only the root, or some one form on which they have built up their modern verb with all its varied tenses, these verbs of the older creation adhere more closely to the Prakrit and take their preterite from its preterite and some of their other forms from those of the corresponding tense in Prakrit. Thus देना makes its past tense दियो, from दितो, for दन ; also दीनो from दियो, and दीयो from दिहो, all three Prakr. forms. Of the three the commonest perhaps is दीनो; to which rhyme कीनो from करना, and लीनो from लेना. In one or two passages occurs a form भीनो, which I have rendered "filled," supposing it to be from भरना on the analogy of करना. In the cases of करना and लेना, Chand has also the preterites कीया and कियो, लीयो, but not लिहो, the cause of which will be explained below. The three words दीनो, कीनो, and लीनो are often shorn of their last syllable especially at the end of a line, as

कनक मुखा तहाँ कीन ॥

He performed there the ceremony of *kanaktulā*. VIII. 5. 2.

To which rhymes

बंदि अप्य कर दीन ॥

Dividing, with his own hand gave. *ib.* 4.

परिनास जुष पर डकुम दीन ॥

Parimal gave the order for war. XXI. 5. 32.

दस कोष नाथ मुकास कीन ॥

दस नाम नगर पुर लूट लीन ॥

Having gone ten *kos* he made a halt,

The villages, towns and cities between he plundered. 208. 9-10.

It is one of Chand's favourite rhymes, and in all these cases the subject of verbs is a nom. masc. sing. Of the full forms, the following are examples :

अनंगपाल पुनी सुरंग ॥
 पुन दया फल दिने ॥
 नातिकेर फल सुफल ॥
 संत आरंभन किने ॥

Concerning the translation of this passage there may be some doubt; literally it is easy enough, as the meaning of each individual word is well known, but how to put them together so as to make consecutive sentences is a difficulty; "Anangpal—daughter—beautiful (or, taking *su* as an expletive, 'delight')

Son—wish—fruit—gave.

Cocoanut—fruit—good fruit.

Spell (mantra)—beginning—made.

It probably means that Anangpāl had a daughter whose desire for a son bore fruit (to wit by the birth of Prithirāj), the fruit of the cocoanut is the emblem of marriage, and he or she, commenced some spells, why or wherefore *non liquet*. It is a fair specimen of Chand's enigmatical style.

सुद चाव चंदेल सु कीने ॥
 यह परिमल लिखो करि दोने ॥

Good speed the Chandel made,

(Saying) "Parimāl hath written this" gave it into his hand.

XXI. 124. 4.

Of the forms दिह and दीष the following instances have been noted :

वर दीषो ढंढा नरिंद ॥

Ḍhunḍhā the king gave a blessing. I. 305. 1.

प्रथिराज ताहि दो देस दिह ॥

Prithirāj gave him two provinces. I. 307. 61.

Here the final syllable is cut off to rhyme with प्रसिद्ध in the next line.

पुनी पुन उवाह ॥ दान मान बन दिदिय ॥

धाम धाम गावत धमार ॥ मनऊ अहि बन मनि लदिय ॥

(For) joy (of his) daughter's (having a) son, gifts and honours many he gave,

House to house singing songs of joy, like a serpent finding a jewel in the forest (?).

The past tense लदिय arises from the fact that the verb *lend* in Hindi is derived from the Skr. लभन्, through forms लरन and लदिन, and the pp. in Skr. is लब्ध, whence H. लदिय. Although in Hindi the number of verbs of this class, those namely which form their present from one part of a Sanskr. verb, and their preterite from another, is so small that they have been classed as irregular, yet in the other cognate languages, notably in Sindhi and Gujarati, the number is very large; for instance Sindhi लनवु to take (H.

लेन) makes its pp. लघो, i. e. लब्ध. (See Trumpp's Sindhi Gr. p. 272, and my Comp. Gram. p. 138.)

I have also noted an instance in which the च under the influence of the adjacent palatal vowel changes into ज (ज्ज)—

सगरी नाव जाय बंध किज्जय ॥

आला उदिल उतरन न दिज्जय ॥

Carts and boats he went and stopped.

Alā and Udil he allowed not to alight. XXI. 86. 1-2.

In Modern Hindi, बध किया and उतर्ने नहि दिया.

Leaving for the present the further discussion of these verbs whose real nature seems not to have hitherto been clearly understood, I now proceed to draw out the manifold variations of the verb 'to be,' whether derived from the root अस् or from भू or (if it be so at all, which I much doubt in Hindi) from स्या.

Illustrations from Chand serve not only for his works, but in many cases also for old Hindi literature in general. Tulsi Das, Sur Das, Kesab Das, Kabir, and others are all writers in virtually the same idiom, though Chand is older and more obscure than most of them, and has occasionally forms which have dropped out of use since his time. It will strike the reader, however, that Chand uses the same word in different stages of development according as it suits his purpose. In the case for instance of सध, we have every stage from the pure Sanskrit down to the modern vernacular. In such cases it is generally the modern and later forms which agree with those in use in the general run of Hindi poets. Tulsi Das, though, from his extensive popularity, he is usually taken as the typical poet of mediæval Hindi, is not so really from a linguistic point of view. His language is very rustic, and seems, as Dr. Hoernle has remarked, to contain words and forms taken from all the provinces of Hindustan. Sur Das is much purer and more typical. The forms given below are not then all peculiar to Chand, but many of them he shares with his successors.

The preterite, which for convenience sake I take first, as in a narrative poem like this, it naturally occurs oftener than the other tenses, has three forms.

1st form Sing. m. भयो, Pl. M. अर

f. भई [भई]

भयो is very common, as in भयो तास तासस राज ॥

Wroth was then the king. I. 48. 26.

रौ भयो रिषि अचभूत ॥

Thus was the wonderful Rishi. ib.

अनंगपाल भयो राज ॥

Anangpal became king. III. 17. 4.

It is contracted to भौ, in सुनि बखन राज मन भौ उदेन ॥

Hearing the news the king was perturbed in spirit. I. 172. 4.

मन भौ खल करन सुनि बारध ॥

Laughter was in her mind, then pity came. III. 10. 4.

Feminine भर, as in ordinary mediæval Hindi, as

पुन कथा भौ भर ॥

How the former story was. III. 15. 2.

Plural masc. भर, as भर विकल लोग बारल उताप ॥

The folk were harassed, wounded, and distressed. XXI. 5. 5.

Of भर, the fem. pl., I have no examples. In तब सकल भरय एकव नारि ॥ quoted above, it may perhaps be that a fem. pl. is meant and the anuswara has been omitted by the copyist.

The second form is उतो and उतो, plural उते, of which I have already given instances. It is from this form (Skr. भूत) that I derive छा, and not from छित्त. The *u* of उता goes out in Gujarati चतो, चती, etc., in which language the form चते, the legitimate descendant of छित्त, stands in its proper place as the preterite of a verb चव from छा, parallel to which is Oriya चित्ता, preterite of चित्ता, side by side with चेत्ता from चेत्ता (भू). From the form चते, by elision of त and coalition of the vowels (perhaps through a transitional form चौ), comes the ordinary Brijbhasha form चो, ची, etc., and by another process the form चतो became चो, *i. e.* *tho*, for *h'to*. The Hindi appears not to have retained any relics of the verb छा, as a verb, though it has numerous nominal derivatives of it.

Chand has yet another form of the preterite उच with short final *a*, not very uncommon in occurrence, as

मति करउ सोच मन संच मानि ॥

उच राज बाज वर बाहुवान ॥

Grieve not, but heed my spell

Ruling has (ever) been the business of the doughty Chauhan.

III. 27. 26.

Connected with which is the conjunctive participle उचै, in

बीबाच उचै वर बन गयो ॥

The marriage having taken place, the bridegroom went to the forest. I. 170. 11.

The present tense contains no peculiarities. चै 'I am' has been quoted, but I may mention that I have not yet come across the modern चै "is." It seems to come from चवि, which is first split up into चववि, then the व is dropped leaving चवर from which by change of व into च and interpolating a second च, we get Tulsi Das and Kabir's form चचवि, whence the transition is easy to चर, *i. e.*, चै. It does not appear quite certain that all this process had been as yet gone through in Chand's time, the cases where चै occurs are

all explainable as futures like करिबै, जुनिबै "he will do," "he will fight," and the like. Thus is formed the future चोरबै, contracted into बैबै, just as in the imperative चोर 'let there be' becomes बै.

प्रबै चोरबै तिन बंसव ॥

Destruction shall be on their race. III. 29. 6.

सब बोखि कह्यो बै सिद्धि सिद्धि ॥

All speaking said, 'May there be success, success.' I. 178. 12.

Another form is चोरि,

चोरि जदवनि सपुतव ॥

The Jadavani shall be with child. I. 249. 6.

and the simpler form of the imperative is चो

जिन सुनत सुध भव चो तन्ननि ॥ (तन्ननि = तन्निनी)

Which bearing be thy nature purified, O lady. I. 14. 4.

In the substantive verb the vague crude form in short *i* occurs constantly, as a present and as future as well as in its more correct sense of a conjunctive participle. It is one of the commonest words and forms in Chand and more than one illustration must therefore be given.

There can be little doubt as to its future sense in the following;—

दिवस पंच बै चतुरै । चोर सु दिखी पति ॥

In five days' time he shall be lord of Delhi. III. 11. 4.

Again a few lines later on

जोगनगर जोगिन कबै । प्रभु सु चोर प्रभु राव ॥

Of Jognagar (Delhi), saith the astrologer,

Shall be lord indeed Prithi Rao (Prithirāj). ib. 13. 3-4.

And again—दुसर तें चाहुवान ॥ चन चोर तुरकानी ॥

After the Tuar the Chahuvan, lastly shall be the Turk. ib. 26. 8.

All these three are prophecies, and there can be no doubt about the future sense, in which case we may regard this form as shortened from the fuller चोरबै. Less distinct, and hovering round to a potential present are—

को सवार चार बाप वर ॥

How may there be release from the curse for the hero. I. 58. 2.

करि सकों प्रब तो चोर चास ॥

If I were to boast, then there might be laughter. I. 11. ult.

In the next quotation it must, I think, be regarded as distinct historical present—

कबै चंद गुन चंद पति ॥

मोक्ष च इंसु चोर ॥

चाहुवान चंदेस कुच ॥

चंदेस उपजन चोर ॥ XXI. 1. 1-4.

Telleth Chand reciting a virtuous strophe,

That wrath and discord,
(When twixt) Chahuván and Chandel tribes
Strife is engendered.

So also in चवन सुनत होर अन ॥

The ear hearing it is broken. I. 159. 2.

होर होमहार सीता हरन ॥

The rape of Sita, (which was) predestined, takes place. III. 27. 34.

In this latter case it may also be a preterite. Finally, as instances of its use in its more legitimate sense of a conjunctive participle,

होर प्रसन्न सुकदेव कहि ॥

Being pleased saith Sukdev. I. 60. 10.

बैलोक जीति जिन जोर तीन ॥

तेउ मये चंत होर बाउ तीन ॥

They who swayed having conquered the three worlds,

They too have gone at last, being without profit. III. 27. 53, 54.

(बाउ = बाब)

Of the present participle there are two forms ऊबंत and होन.

तुम बाबो बाबी प्रसन्न

हसुन ऊबंत निबारि ॥

Thy voice is a pleasing voice, laughing being prevented. I. 12. 4.

(i. e., no one can laugh at you.)

पुन होन मरई क्षत्य ॥

The son being born she died. I. 170. 3.

(i. e., she died in giving birth to the son.)

Of the future participle होमहार 'that which is to be,' destiny, an illustration has just been given. Others are—

ते कहू होमहार पचबानिय ॥

Thou knowing somewhat of that which is to be. XXI. 92. 2.

And a few lines further on in a slightly different shape—

झनहार रेखी खो ॥

कही जु. बाबह उपाय ॥

Thus is written (as) about to be

The plan which Álhá has said. XXI. 94. 1, 2.

Want of leisure prevents me at present from continuing these studies. I hope at a future time to supplement these remarks on the leading features of Chand's style, by some further suggestions as to some of his more exceptional and unusual forms—many of which are puzzles of the most startling description. Perhaps the notes here given may be of use so far

as they go, and the copious quotations will illustrate many more points than those which they are specially intended for. To those who approach Chand fortified by previous reading of the mediæval Hindi poets, the majority of the forms given above will be already to a great extent familiar, but to those who approach him from the direction of Sanskrit and Prakrit studies, his style will be absolutely unintelligible without some such clue as that, the outlines of which I have sketched in these notes.

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*Further note on coins from Kausambhi.*—By THE HONORABLE  
E. C. BAYLEY, C. S. I., C. S.

Since writing on the two coins sent by Bábu Sivaprasád from Kausambhi,\* I have had the advantage of showing the coins themselves to General Cunningham. He at once expressed his preference for reading the third letter of No. 2, as स *sa*, instead of ज *ja*. He said that he thought he had coins in his cabinet which would throw light on the matter.

He has since found two of which he kindly allows me to make use. One of these is the exact duplicate of coin No. 2, but has only the latter half of the inscription perfect. The other coin is in better preservation; its material is brass, and while it differs slightly in type, has the same legend as No. 2, but the third letter is unmistakably स. The whole of the letters on this coin are of a squarer type than those of my coin, so much so that the first letter might almost be read as ब, "ba," if it were not for the clear shape of the letter on my coin.

The total legend must, however, now be read as—

डह सत मित्र, "ṭaha sata mita"

"The friend of the virtuous iconoclast"—

A reading which is a clear improvement on those previously suggested.

Both of General Cunningham's coins have the same reverse, a bull with the svastika over its hindquarters and standing in front of a Buddhist chaitya with Buddhist railing very clear, so that now there can hardly be any doubt of the Buddhist character of the legend. General Cunningham's best coin has the symbol on the left of the obverse somewhat different from my coin, but it is not quite distinct enough for satisfactory recognition. General Cunningham says that one of the coins at least was procured at Batesar, which is on the Jamuná, though at some distance above Kausambhi, from which place it may have possibly come.

\* *Vide* above, page 109.

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JOURNAL

OF THE

ASIATIC SOCIETY

Part I.—HISTORY, LITERATURE, &c.

No. III.—1873.

Authorities for the History of the Portuguese in India.—By
T. W. H. TOLBORT, B. C. S.

The History of the Portuguese in India is a subject of considerable interest, though the attention given to it, of late years, by English orientlists is scant. As a contribution to the subject I submit a list of the authors whose works are most valuable. The list does not profess to be exhaustive, but it will be found to embrace the most important sources of information.

I limit the range of these authorities to the period between 1498, when Vasco da Gama discovered India, and 1663, when the capture of Cochin by the Dutch finally broke the power of the Portuguese, and established the supremacy of others in the East. During that period, the adventures of the Portuguese form a chapter of Universal History. In years subsequent to 1663, the subject, though not devoid of incidents of gallantry and romance, dwindles to one of national rather than universal interest.

As an introduction to the subject must be read Mr. Major's interesting Life of Prince Henry the Navigator. This is founded chiefly on old Portuguese authorities, an account of whom is given in the preface; but Mr. Major's narrative is, to all appearance, so complete and accurate, that we may accept it, coupled with the well written summary by Barros, without consulting other authors.

For our present purpose, research must begin where the main thread of Mr. Major's work ends. Starting then from 1497, we have first—

Gaspar Correa. *Lendas da India*, 4 Vols., 4to. Correa is the oldest historian, and is by many considered the most reliable; but, strange to say, his

history, though written in or about 1561, lay in manuscript till a few years ago, when it was printed by the Lisbon Academy. The publication was commenced in 1858 and concluded in 1864. Correa came to India in or about 1512, and served as Albuquerque's amanuensis. His stay in India was not continuous, but it was at Goa that he ended his days.

His history comprises the period from Vasco da Gama's voyage in 1497 to the Government of Jorge Cabral in 1550. The earlier portion is partly founded on the manuscript (now lost) of Joao Figueira, a priest who accompanied Vasco da Gama. The bulk of the work from 1512 to 1550 has all the advantages of contemporary history by the pen of a truthful and intelligent writer. The work is illustrated with pictures of towns, and portraits of the Viceroys taken, I believe, from pen and ink sketches by Correa himself. Most of the towns are fairly represented, though without accuracy of detail. For instance Aden, Diu, and Colombo, as they appeared in the sixteenth century, can at once be identified by any one who has seen them as they are now. Correa has been termed the "Polybius" of Portuguese History in India. Selections from his work, comprising the three voyages of Vasco da Gama, have been translated and published in English by the Hon. H. Stanley.

João de Barros, the Livy of Portuguese History. His work, in four Decades, though somewhat later than the histories by Correa and Castanheda was, until the last few years, universally regarded as the standard authority on the subject. The recent publication of Correa's *Lendas* raises the question whether Correa or Barros should be followed where discrepancies exist (and in detail such discrepancies are numerous); upon the whole it seems likely that Barros will always hold his place in the opinion of his own countrymen as well as in that of foreigners as the chief of Portuguese Historians. His style is admired, and he gives an interesting sketch of the Portuguese discoveries prior to Vasco da Gama's voyage, a necessary introduction, which Correa and Castanheda omit. Barros died in 1570. He never visited India, but had special facilities for his study as an official in the India Office at Lisbon.

Diogo de Couto, the continuator of João de Barros. De Couto served in India, and though his portion of the History is not considered equal to that written by Barros, it is the best we have for the latter half of the sixteenth century. The fourth Decade by Barros comes down to the death of Nuno da Cunha in 1589, but as this Decade had not appeared when De Couto commenced his continuation, he began twelve years earlier, bringing the continuation down to 1600. The joint History of De Barros and De Couto consists of twenty-four 8vo. Vols., there being for the reason above stated a duplicate account of the twelve years comprised in the governments of Lopo Vaz de Sampaio and Nuno da Cunha.

Castanheda. This historian came to India in 1528, and the eight books of his *History* were published between 1551 and 1561. They bring the narrative of Portuguese conquest down to the first siege of Diu in 1538, covering nearly the same period as De Barros. Castanheda intended to publish ten books, but the last two seem to have been suppressed, because they reflected on some of the grandees who had influence at Court. I cannot, however, say for certain that the last two books of Castanheda were never published. My own copy omits them, but from a list kindly given to me by Senhor da Cunha Rivara, Secretary to the Portuguese Government at Goa, it would appear that Castanheda's history is brought down to 1550. Castanheda is said to have travelled all over Portuguese India, with the laudable desire of testing and correcting his history.

Maffei, *Historia Indicarum*, a Latin history, based I believe on Barros. It is in one volume comprising sixteen books. It ends with the death of King John the Third in 1557, and is dedicated to Philip the Second. The author was a Jesuit; and attached to his principal work are four books of *Epistolæ Indicæ*, selected letters from India, a very valuable appendix.

San Romano, a Benedictine monk, wrote a *History* of the same period in Spanish. I have not seen this work, but believe it is founded on Maffei and is inferior to the original.

Faria y Sousa. His *History* was published in both Portuguese and Spanish. It embraces a more extended period than any of the others, beginning with the early voyages of discovery, and ending in 1640, at the eve of the Revolution which restored Portuguese independence. An English translation from the Spanish was published in 1695, with a dedication to Catharine, Queen Dowager, Charles the Second's widow.

For the sixteenth century, Faria y Sousa is an inferior authority to the earlier writers, but he is the one generally quoted by English authors, because his account is the most complete as well as the most easily read. I am surprised that the Library of the Asiatic Society at Calcutta does not contain a copy of the translation. The copy of the original in the public library at Goa seems to be imperfect. Faria y Sousa gives a list of the books and manuscripts from which he collected his information.

Lafitau, "*Histoire des Découvertes des Portugais*," in French, 2 Vols. There is a copy in the public library at Pondicherry, but not, I think, in our own library at Calcutta. I have not read this work through, but from a cursory examination, it seems like most French *Histories* to be readable and interesting. Lafitau names the authors he has consulted, and brings his narrative down to the same time as Faria y Sousa.

The above authors are all professed historians, who treat their subject generally. But history is usually more indebted to particular accounts,

memoirs, and personal narratives than to prolonged chronicles which are necessarily themselves compilations. This is especially true of Portuguese History in India. Passing on then to this class of authors we find—

"The Roteiro," the account of Vasco da Gama's voyage, followed by Mr. Major in his *Life of Prince Henry*. I have not seen this, but it is evidently a work of authority.

The *Commentaries* of the great Albuquerque, compiled by his son from the official despatches sent by Albuquerque to King Manuel. They appeared in 1557.

The *Chronicle of King Manuel* himself by Damiao de Goes, published during the reign of King Sebastian, and dedicated to the Cardinal Prince Henry.

The *History of the Portuguese* during the reign of Emmanuel, by Osorio, Bishop of Sylves, in Latin. This, though based on the *Chronicle of Damiao de Goes*, is superior to it as a literary work. There is an English translation, published in 1752.

Antonio Galvan, a contemporary of the Governor Nuno da Cunha, is said by Faria y Sousa to have written much concerning India and particularly about the Spice Islands, but Faria y Sousa was unable to find any of his works except "the Book he calls of Discoveries, which is only short hints of things." I presume this is the "*Tratado dos diversos e desvayrados caminhos, &c.*" If any other works by this author are extant, they will be very valuable. Crawford eulogizes the author in the following terms: "Of all the Portuguese names connected with the Indian Archipelago incomparably the greatest, except of Magellan, is that of the virtuous, the pious, the discreet, and heroic Antonio Galvan." The failure of Faria y Sousa to find his manuscripts is no proof that they do not exist; for the instance of Correa's great *History*, to say nothing of numerous other books, shows that in Portugal the most valuable manuscripts may lie hidden for centuries.

I here insert a note by the editors of Correa's *History*, which details all the printed works prior to the date of that author.

"The printed Portuguese books regarding the *History of India*, of which Gaspar Correa might have had knowledge, although he may not have seen them all, still less possessed them, are,—the *Life of D. Joao II.*, by Garcia de Resende; Castanheda's *History*; the three first *Decades of Joao de Barros*; the first book of the siege of Diu, by Lopo de Sousa Coutinho; the *Commentaries of Albuquerque*; the *Itinerary of Antonio Tenreiro*; the *Book of Antonio Galvao, Tratado dos diversos e desvayrados caminhos, &c.*; the *Relation of the Embassy of the Patriarch D. Joao Bermudes*; the *Chronicles of the King D. Manuel and of the Prince D. Joao* by Damiao de Goes; the *treatise on the affairs of China* by Fr. Gaspar da Cruz; the

commentary of the siege of Goa and Chaul, by Antonio de Castilho; and some other which we have forgotten."

The Life of D. Joao de Castro, by Jacinto Freire de Andrade. This work has passed through several editions and is considered one of the Portuguese classics. The second siege of Diu by the King of Gujarat occurred during the Viceroyalty of D. Joao de Castro, and the defence and relief of the fortress are deservedly regarded by the Portuguese as among the greatest of their achievements. The edition of the "Life" published in 1885 contains valuable notes with selections from Castro's correspondence, among these are letters regarding Persian histories of Alexander the Great, probably the "Sikandarnamah," for which D. Joao de Castro, who was a man of literary as well as military ability, had sent. There is a work by D. Joao de Castro himself, the "Roteiro," giving an account of his voyage up the Red Sea in 1540.

The Chronicle of King John the Third; by Andrade, is another work thought very highly of by the Portuguese themselves.

There must be frequent references to Indian affairs in the Chronicles and Histories of other Portuguese and Spanish Monarchs, but the reigns of Emmanuel and John the Third were the "golden age" of Portuguese rule in India. Those of Sebastian and Philip the Second may be considered the "silver age," and subsequent reigns down to the capture of Cochin "the age of brass."

St. Francis Xavier was a contemporary of Don Joao de Castro; his life and work are so intimately connected with Portuguese India, that authorities regarding them may well be referred to here. Xavier's own letters are the best source of information regarding him. There is the old Latin edition of Tursellinus, and a modern French one by Léon Pagès. Of professed biographies, the most authentic is that in Portuguese by Lucena, and the most popular that in French by Bohours. Three recent biographies should also be consulted. First that by Venn, written from the Protestant standpoint. Second, a volume of Xavier's life and letters, published last year, 1872, by the Rev. H. J. Coleridge, an English Jesuit. (The second volume has not yet appeared.) Third, a Life of the Saint published at Goa in 1861, by Senhor Felipe Neri Xavier, Director of the National Press. This contains much miscellaneous information regarding Xavier and his tomb.

As Xavier is the Saint of Portuguese India, so is Camoens its Poet. The *Lusiad* is an authority in Portuguese History just as Shakespeare is for our own Plantagenets. National pride and patriotism pervade it, and great events which would be smothered in a mere chronicle of facts are brought by it prominently and picturesquely to view. There are many well known lives of Camoens, and many editions of the *Lusiad* in all European languages. The Portuguese (I believe) regard the edition of the

Lusiad by D. José Maria de Souza Botelho with most favour. In English, Adamson's *Life of Camoens*, and Mickle's translation of the *Lusiad* are best known.

There is another Portuguese epic "*Malaca conquistada*," of which Albuquerque is the hero, but this has never attained general celebrity.

The *Chronicle of Luis de Ataíde*, by Antonio Pereira. I have not seen this work, but it is quoted both by Faria y Sousa and by Lafitau. Luis de Ataíde was twice Viceroy of India, in 1567, and again in 1578.

Diogo de Couto, the continuator of Barros, was a voluminous writer, and during his prolonged connection with Indian affairs (from 1556 to 1616) wrote many minor works besides his *History*. Among these are numerous orations to the incoming Viceroys. Also a *Life of D. Paul de Lima*, a celebrated Portuguese Captain, who died about 1589, and an interesting treatise called the "*Soldado Prático*." I have not seen any of these works, but Mr. Stanley in the introduction to his "*Three voyages of Vasco da Gama*" gives an abstract of the "*Soldado Prático*," which is a critique on the numerous defects of the Portuguese administration in India.

The Portuguese Missions to Akbar from 1582 to 1605 constitute one of the most interesting chapters in the *History of Portuguese India*. The account usually quoted is that by M. Manouchi, who was for many years Aurangzeb's physician. I have not seen his *History*, but it appears to have been published as a separate work. According to Hough, who devotes a chapter to these Missions, there are valuable manuscript accounts in the British Museum, some it seems in the original handwriting of the Missionaries. There are also narratives of the Mission in Murray's *Asiatic Discoveries*. There is an Italian account of Akbar and of the Jesuit Mission by Peruschi.

The close of the sixteenth century is remarkable in the annals of Portuguese India for the attempt to reconcile the heretical Syrian Church of Travancor to Rome. The chief authorities for this episode are Gouvea's *Jornada do Arcebispo de Goa*, D. Fr. Aleixo de Meneses as *Terras do Malabar*; Geddes, *History of the Church of Malabar*; La Croze, *Histoire du Christianisme des Indes*; Hough's *Christianity in India*; Lee's *History of the Syrian Church*, in one of the Church Missionary Society's Reports; Howard's *Christians of Saint Thomas*; Day's *Cochin*.

There are several other accounts, but the above contain all that is important. Day's *Cochin* is a valuable work generally, as Cochin was the most important Portuguese settlement in continental India next to Goa, and everything connected with it has some bearing on our subject.

While we are on the ground of ecclesiastical history, the following works may be named as in some way connected with Portuguese India, where formerly the predominance of ecclesiastical influence was so marked.

The "*India Orientalis Christiana*" by *Paulinus Bartholomæus*, said to be a work of great merit but very rare.

Francisco Sousa's "*Oriente conquistado a Jesu Christo pelos pad-res da companhia de Jesus.*" This work was published in the beginning of the eighteenth century. It seems to be regarded by later Portuguese writers as an authority for secular as well as ecclesiastical history, and is, I presume, the work referred to in *Cottinean's Sketch of Goa*, page 21.

Bartoli's Asia. This, I believe, is the standard Jesuit authority, but there are numerous other histories of the Jesuits.

Historia das Inquisiçoes, published at Lisbon in 1821.

Historia da origem e estabelecimento da Inquisiçao em Portugal, by *Herculano*.

I have not seen the above works but the following which also have some bearing on the subject are to be found in the Public Library at Goa—

Tellez, *Chronica da companhia de Jesus.*

Luis de Sousa, *History of the Dominicans.*

Damian Cornejo, *Chronica seraphica*, or *History of the Franciscans.*

Pedro Monteiro, *History of the Inquisition.*

It may be observed that the Goa Library is chiefly composed of books which were taken from various convents when the monastic orders were suppressed. No doubt, it contains many other books of historical interest, which a hurried visit did not give me time to discover.

Faria y Sousa refers to a manuscript ecclesiastical History, called "*The Spiritual Conquest in Asia*," written by *F. Paul* of the Trinity, a Franciscan, in the year 1630. Probably this has since been printed.

For the seventeenth century printed authorities are rare. *Faria y Sousa* refers to a manuscript by *Antonio Bocarro*, apparently a continuation of *De Coufo*, and also to accounts of *Nuno Alvarez Botello* and the Count de *Linhares* (1629 to 1635), the former in print, and the latter in manuscript. I suppose, it was the same *Antonio Bocarro* who wrote the description of the Fortresses of India, extracts from which have been published by *Sr. da Cunha Rivara* in the "*Tissuary.*"

Mr. Stanley gives a summary of a manuscript found by him in the Library of Lisbon, entitled "*History of the Elevation and Decadence of the Portuguese Empire in Asia*," which gives some account of the seventeenth century.

Between 1640, the date at which *Faria y Sousa* closes his *History* (also the year in which Portugal recovered her independence), and 1668, the year in which Cochin was taken by the Dutch, there seems to be almost a blank so far as printed Portuguese authorities are concerned, but the deficiency is made good by an increased number of Dutch and French writers. The

ecclesiastical history of these few years is carried on by a Carmelite missionary, Vincenzo Maria, in his *Viaggio all' Indie Orientali*.

The expeditions, military and ecclesiastical, to Abyssinia; the rise and fall of Christianity in Japan; the rivalry with the Spaniards and Dutch in the Malay Archipelago; and the wars in Ceylon, may fairly be treated as episodes in the History of Portuguese India.

Regarding Abyssinia, the chief authorities are:

Francisco Alvares, *Terras do Preste Joao*.

Tellez, *Historia de Ethiopia*.

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Geddes, *Church History in Ethiopia*; La Crose, *Christianisme d'Ethiopie*; Ludolf's *Historia Æthiopica*.

Regarding Japan,—Kä mfer's well known book is generally accepted as the best authority.

There is a work in Spanish "*Christiandad del Japon*," by Sicardo, of which there are copies in the public library at Goa. There are also collections of "*Epistolæ Japonicæ*," as of "*Epistolæ Indicæ*." The Rev. H. J. Coleridge states that M. Léon Pagès is about to publish a work on the subject.

The Chinese mission, though organised from Macao, was not so connected with politics as the Japan mission, and the early missionaries were mostly Italians not Portuguese. There is a description of China by Faria y Sousa, founded on the Memoirs of Semedo, and there is a separate account of the commencement of the mission under Ricci. There is also the great work of Du Halde.

Regarding the Malay Archipelago, most English accounts of the islands give a sketch of the early Portuguese rule. Crawford's works, and St. John's *Indian Archipelago* may be cited as the most useful. Raffles' *Java* scarcely refers to the Portuguese, but his *Life and Journal* gives a native account of the arrival of the Portuguese at Malacca. I have not yet had an opportunity of referring to Marsden's *Sumatra*. Faria y Sousa, besides his reference to Antonio Galvan, mentions Bartholomew de Argensola as an authority, though an unsafe one, for the History of the Spice Islands. I have a French translation of Argensola entitled "*Conquête des Isles Moluques par les Espagnols, par les Portugais, et par les Hollandais*." The third volume containing the conquest by the Dutch is a continuation of the original work. There is also an English translation of Argensola. There is another account of the Moluccas, by Gabriel Rebello, in the sixth volume of the "*Noticias para a Historia e Geografia das nações ultramarinas*."

Regarding Ceylon, our information may be considered abundant and satisfactory. Sir Emerson Tennent devotes the first two chapters of his second volume to the Portuguese and Dutch rule, and refers to two Portu-

guese authorities who treat specially of Ceylon,—Ribeiro, and Rodrigues de Saa. The latter wrote an account of the expedition of 1630, in which his father was killed. There is also a Portuguese account of the siege of Colombo, translated and attached to Baldæus' narrative in Churchill's voyages. Baldæus himself, a Dutch writer, is the best authority for the final struggle between the Dutch and Portuguese, giving a sketch of the negotiations and military movements, with details of the sieges of Colombo and Cochin and engravings of the different forts and towns. Ribeiro's History is contained in the fifth volume of the "Noticias para a Historia e Geografia das nações ultramarinas." There is a French translation by LeGrand and an English translation, now rare, by Lee. Sir Emerson Tennent mentions Johann Jacob Saars, as giving in German an account of the campaign in which Colombo was captured. Wouter Schouten's "Oostindische Voyagie" is another narrative of the same period.

The above list does not include many "Travels," although the most vivid and faithful pictures of Portuguese India in the 16th and 17th centuries are to be found in the narratives of European travellers. The number of these is so great, that we can only specify a few, referring enquirers to the standard collections of voyages for further details. These collections are well known,—Ramusio, Purchas, Hakluyt, De Bry, Le Brun, Hulsius, Recueil des Voyages de la Compagnie des Indes Orientales des Pays-bas, La Harpe, Dampier, Harris, Pinkerton, Thevenot, Churchill, Astley, Lockman, Kerr, Murray, and others. There are two or three Italian collections of value besides Ramusio, and there are some Indian voyages in the Portuguese "Noticias."

Among individual Travels the most noteworthy, either for their intrinsic value, or for their bearing on our present subject, are—

Odoardo Barbosa. The earliest description of India after Portuguese discovery.

The voyage of Magellan, which first took the Spaniards to the East.

The voyage of Sir Francis Drake, the first appearance of the "Heretics" in those seas.

The "Peregrinações" of Mendez Pinto.

Linschoten's Itinerarium.

Travels of Pyrard de Laval (1601 to 1611). The original is in French, but there is a Portuguese translation, published at Goa by Senhor Rivara. Pyrard de Laval's book is of special value as he resided at Goa when the prosperity of that city was at its height; for although the glory of Portuguese India had begun to diminish some years earlier, the splendour of Goa as a city, was greatest during the first few years of the seventeenth century. Pyrard's description is detailed and interesting.

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Dellon's narrative of the Inquisition of Goa. The original was pub-

lished in French in 1687, but there is a Portuguese translation, published at Goa in 1866 under the auspices of Sr. Rivara. This translation contains some valuable notes, and adds as an appendix the account of the Inquisition given by Dr. Claudius Buchanan in 1808 in the *Christian Researches*.

A narrative of the expedition against Ormus, when the Persians and English united to expel the Portuguese in 1622. This is contained in the collections by Purchas and Kerr.

Baldæus, the Dutch historian of the final struggle between Hollanders and Portuguese. The translation of his *Travels* is in Churchill's Collection.

Tavernier gives a description of Goa, a narrative of the persecution in Japan, a sketch of Dutch history in the East, and an account of the capture of Cochin. Altogether, Tavernier is a very valuable writer for our present purpose, as his information refers precisely to the period when Portuguese supremacy in India was disappearing.

There are numerous travellers a little later than Tavernier, whose narratives contain frequent references to the Portuguese. Among these may be named Bernier, Nieuhoff, Carreri, Fryer, and Hamilton.

Lastly, there is a modern account of Goa, written in English by the Rev. Cotteneau de Kloguen and published at Madras in 1831. This contains a complete historical sketch of Goa from 1509 down to 1812, and gives a description of all the churches, convents, and other public buildings, accompanied by a map. It is, in fact, a modern guide to Goa. There is a Portuguese translation, which I have not seen. Probably the notes of the translation are of value, as it was published in Goa itself at a comparatively recent date (1854).

There is another modern account of the Portuguese possessions in Asia, by Gonçalo de Magalhaes Teixeira Pinto, also published at Goa with notes by Sr. Rivara. It is a mere pamphlet, but it contains some official documents regarding the transfer of Bombay to the English.

As the Dutch were for sixty years the rivals of the Portuguese in Asia, it is reasonable to suppose that voluminous information may be collected from Dutch authorities. Besides the early Dutch voyages, and the travels of Baldæus already referred to, there is the great work of Valentyn, '*Oud en Nieuw Oost Indien*.' Tennent refers frequently to this work. There is one copy in our own library at Calcutta, and there is another, wanting the first volume, at Madras. No doubt, a student acquainted with Dutch would find the works of numerous other authors at Batavia and Amsterdam.

It remains to notice official records and periodicals. I believe there are now few records of value at Goa. All that survived have been transferred to Lisbon, and are to be found there in the Torre do Tombo and other collections of Archives. But a very valuable work has been published at Goa

by Sr. da Cunha Rivara from the records of the 16th century. This work the "Arquivo Portuguez oriental" is in five fasciuli, comprising altogether eight volumes. Of these, fasciculus No. 1 is out of print, the remaining seven volumes may be obtained from the Imprensa Nacional at Goa. The contents of the eight vols. are as follows :

Fasciculus 1, letters from the Kings of Portugal to the City of Goa.

Do. 2. Book of the privileges of the City of Goa.

Do. 3 (2 parts or vols). Letters and instructions from the Kings of Portugal to the Viceroy and Governors of India, and also charters and ordinances of the Kings and Viceroys.

Do. 4. The Ecclesiastical Councils held at Goa and the Synod of Diampar.

Do. 5. (3 parts). Various documents of the 16th century. Among these are important regulations regarding the administration of justice, the management of the Goa hospital, military and commercial matters. The references to the contemporary history of Muhammadan India are not very many. There are, however, some diplomatic documents referring to Bijápúr.

In the preface to his third fasciculus, Sr. da Cunha Rivara discusses an interesting question regarding some of the 16th century records. During the 16th and 17th centuries, the intercourse between India and Portugal was chiefly carried on by annual fleets to and fro, and the annual letters that they carried. As the arrival and despatch of the fleets were regulated by the monsoons, the registers containing copies of official letters were known as the 'Livros das Monções,' 'Books of the Monsoons.' At the time Sr. Rivara wrote his preface, the record rooms at Goa appear to have contained fragments of the "Livros" for the years 1568 and 1583, then a series from 1584 to about the end of the century, and then (after a gap of fifty years) a continuous series from 1651 to modern times. It was long believed that the absence of the "Livros" earlier than 1568 had been caused by the Marquis de Pombal, under whose orders sixty volumes of the series were despatched to Portugal in 1777. Sr. Rivara, however, proves that the sixty volumes so despatched, were those between 1606 and 1651, and that *they* at least are safely housed in the Torre do Tombo at Lisbon. About the same time, and in obedience to the same order all the ecclesiastical records of an early date were also sent to Lisbon, but these, it seems, have been lost sight of.

I believe I am right in adding that the remaining "Livros das Monções" have been recently transmitted to Lisbon, since the publication of Sr. Rivara's Arquivo. Possibly some of the missing records are to be found in our own British Museum; for Sir Emerson Tennent in the introduction to his "Ceylon" writes—"Within the last few years, the Trustees of the British

Museum purchased from the library of the late Lord Stuart de Rothesay the diplomatic correspondence and papers of Sebastião Jozé Carvalho e Mello (Portuguese Ambassador at London and Vienna, and subsequently known as the Marquis de Pombal) from 1738 to 1747, including sixty volumes relating to the history of the Portuguese possessions in India and Brazil during the 16th, 17th and 18th centuries. Amongst the latter are forty volumes of despatches relative to India entitled *Collecção Authentica de todas as Leys, Regimentos, Alvarás e mais ordens que se expediram para a Índia, desde o estabelecimento destas conquistas. Ordenada por proviram de 25 de Marco de 1754.* Mss. Brit. Mus., Nos. 20,861 to 20,900."

The "Arquivo" is so far defective that it only gives the outward despatches and letters from Lisbon to Goa together with other documents issued in India. It does not give despatches from Goa to Lisbon, which would be of yet greater value to the student of Indian History. I cannot gather from Sr. Rivara's preface to the third fasciculus where these are, nor does he expressly state that the early "Livros das Monções" are lost beyond recovery. Perhaps the introduction to his first fasciculus, which I have not been able to obtain, throws some light on these points. This much is certain. The Torre do Tombo and other libraries at Lisbon contain a number of valuable records of both the 16th and the 17th century, though it would seem from the preface to "Gaspar Correa" that they are not valued as they deserve to be. I must add that Sr. Rivara's "Arquivo," though richer towards the end, contains a great many documents belonging to the early part of the 16th century. The early "Livros das Monções" have been lost, but there were other early records which Sr. Rivara by publication has saved from a similar fate.

Many articles of historical and antiquarian value have been published in the "Boletim do Governo," the "Government Gazette" of Portuguese India. Among those of recent numbers may be enumerated the "Capitulos de um livro inedito," containing information as to ecclesiastical matters in the 17th century, and a series of Treaties of the same period. Many similar articles are scattered through back numbers of the Boletim, including, I believe, an account of the records by Sr. Felipe Neri Xavier. I hope Sr. Rivara, under whose auspices the majority have been published, will collect and republish these papers in a separate form. It is much to have saved ancient records from destruction, but the service to History will be enhanced by republication. Papers are not readily accessible when scattered through the old files of a Gazette.

I may mention here that Sr. Rivara in addition to the numerous publications above referred to, is the author or editor of several other important works more or less connected with our present subject; among these an historical essay on the Concan, or dialect, of Goa; a dictionary and grammar of the same;

a publication regarding village communities; and several regarding the ecclesiastical rights of the Crown of Portugal and the Archbishop of Goa—vexed questions among the Roman Catholics of India.

Two facts regarding other records may be added from Day's Cochin.

1. The Dutch Government records of Cochin are, it seems, still there, and apparently the early volumes refer to the capture, or to the period immediately following the capture, from the Portuguese (page 121).

2. The records of the Verapoly Monastery were lost in the river, as the priests were endeavouring to carry them away from Tippu's troops in 1790 (Chronology at end of book).

So far I have only referred to European accounts of Portuguese India, but what Indian authors are there on the subject? Hindús, who care so little for history, are not likely to give us much help, but it is different with Muhammadans. They are given to chronicle writing, and we may fairly expect some account of the Portuguese from them. As yet, however, I have not found any special Muhammadan history on the subject, except the "*Tuhfat ul Mujahidin*." This is a valuable work, as it describes the wars of the Portuguese and Muhammadans between 1498 and 1583, from a Muhammadan point of view. There is an English translation, No. 30, in the series of the Oriental Translation Committee.

Firishtah must be consulted, because his histories of the Dakhin States are so full, and refer specially to the period when the Portuguese power was at its height. The eleventh chapter, on the Muhammadans in Malabar, is founded on the *Tuhfat ul Mujahidin*. Besides this, Briggs gives in an appendix an epitome of the wars of the Portuguese in India. But Firishtah's allusions to the Portuguese, except in the eleventh chapter, are very meagre. He gives a brief account of the death of King Bahadur, and of the siege of Chaul by Burhán Nizam Sháh in 1592, but he does not even mention the great siege of Dáu. Still the constant references to the Muhammadan kings by Portuguese historians, and the constant intercourse that must have gone on between the Orientals and the European invaders, render it necessary to consult Firishtah.

Next to Firishtah may be mentioned the *Mir-át i Ahmadi*, with its translation by Bird, and the *Mir-at i Sikandari*, on which the *Mir-át i Ahmadi* was founded.

Firishtah's History of Bijápúr was prematurely closed in 1596, while we seek for information down to 1663. The following supplementary histories of the Dakhin states and particularly of Bijápúr, the one that had most dealings with Goa, are described in Mr. Morley's list of the historical manuscripts preserved in the Library of the Royal Asiatic Society.

Tazkirah i Ahwál i Saláṭin i Bijápúr, composed in 1806 from two earlier histories of the 'Adil Sháhí dynasty. Morley describes this work as concise, but valuable.

Basátin us Salátin. This is also a modern manuscript (1824), but the preface enumerates the authorities from which it was compiled.

Muntakhab i Tawárikh i Bahri, containing a history of the Nizámsháhi dynasty.

Tárikh i Sultán Muhammad Qutbsháhi, a history of the Qutbsháhi dynasty of Golkonda; an abridgement of this is also given in Brigg's *Firishtah*. Mr. Bird in his account of Bijápúr refers to another history the "Tárikh i Haft kursi" and also to the "Tárikh i Asad Khání," which he appears to consider as the same work under a different name. He says that the "Tárikh i Haft kursi" was written in the reign of 'Alí 'Adil Sháh II. (1656 to 1672).

I have not seen any of these manuscript histories of the Dakhin states, but mention them as to some extent bearing on the subject. The names given by Portuguese authors are frequently unintelligible until compared with Persian accounts. But it is not likely that any of these histories give more than casual allusions to the Portuguese.

Passing from the Dakhin to the Mughul histories—

The *Tabaqat i Akbari* contains a few references to the Portuguese, including an account of King Bahádur's death. It refers also to the construction of the Súrat fort against the depredations of the Portuguese.

The *Akbarnámah* refers to King Bahádur's death, and gives some account of the Jesuit missions at Akbar's court. Probably it contains other references to the Portuguese, but I have not yet examined the *Akbarnámah*. I hope Mr. Blochmann, who is so well acquainted with the Persian histories of this period, will add some further account of these references. The *Inshá i Abulfazl* contains a letter from Akbar, a translation of which is given by Hough in his second volume, page 261. This is said to have been intended for the King of Portugal, but the address in my copy of the *Inshá* is "Dánáyán i Farang," as though intended for the Jesuits.

The *Muntakhab ul-tawárikh* of Badaoni also refers to Diú and to the Jesuit missions at Akbar's court. Mr. Blochmann's extracts, attached in a note to the 77th *Ain*, read with the Jesuit account, give a vivid picture of Akbar and his court.

The *Dabistán* contains an account of the Christian religion derived from the Portuguese priests, and gives a sample of the discussions before Akbar.

The *Tuzuk i Jahángiri* alludes in several places to Muqarrab Khán and to Súrat affairs. One passage appears to refer to the attack by Azevedo on Downton's ships in 1614. Elsewhere the *Tuzuk* refers to presents from the Portuguese and to some Portuguese in Jahángir's employ.

The *Pádisháhnámah*, page 483, Vol. I, gives a detailed account of the siege and capture of Húgli. Farther on, this is again referred to in letters to Nazr Muhammad Khán, the ruler of Balkh, and to the Sháh of Persia. At

page 534, the fate of the captives is described. In the second volume, there is an account of the Portuguese at Chittagong.

Kháfi Khán, the most useful of the Muhammadan historians after Firishtah, also gives an account of the siege of Húgli, prefixing to it an interesting description of the Portuguese from his point of view. A fuller description is found in the second volume, page 400, reign of 'Alamgir.

Mr. Blochmann, to whom I am indebted for several of the above references, tells me that the Portuguese are frequently mentioned in the *Maásir ul Uaná, a work containing biographies of the great men of the Mughul empire, and that there are occasional bigoted allusions to them in the Farhang i Rashidi, a Persian dictionary written in 1653.*

A certain amount of information is scattered through different periodicals. No. 3 of the Calcutta Review contains an article on the Jesuit missions; No. 10, the Portuguese in North India; No. 51, the Shiry Family; No. 57, the Inquisition at Goa; No. 77, the Life of Xavier; Nos. 102 and 103, Topography of the Mogul Empire; No. 105, the Feringhees of Chittagong.

The Asiatic Researches contain articles on Malabar; The Syrian Christians; Nobili's imitation of the Veda; and Bijápúr.

The Bengal Asiatic Society's Journal is singularly deficient in articles bearing on our subject. The volume for 1841 mentions the Portuguese in connection with Arakan. That for 1843 contains an interesting account of Abyssinia, and the Portuguese missions there, and the volume for 1844 contains an article called "Political events in the Carnatic from 1564 to 1687," which may be considered to have a distant connection with the contemporary history of Portuguese India. There is also a modern account of Socotra, but so far as I have seen, there is not a single article devoted specially to Portuguese Asia.

The Journal of the Royal Asiatic Society is as deficient as our own in this respect. I cannot find a single article specially devoted to Portuguese India, but the following appear to have a distant bearing on the subject; Vol. II, Transactions, Diplomatic relations between the courts of Delhi and Constantinople, in the 16 and 17 centuries. Vols. I and II, Journal, Memoir on the Syrian Christians; Vol. II, Sea ports on the coast of Malabar; Vol. V, (or VI, ?) account of the Sherley family; Vol. VII, Tribes of the Northern Concan; Vol. V (new series), on Malabar, &c.

The last series of the "Journal Asiatique" gives no help. I have not seen the earlier series. We might expect more assistance from Bombay, as that Presidency has been always intimately connected with Portuguese India. But so far as I have ascertained, there is not much. Vol. II of the Bombay Literary Transactions contains a Turkish account of a naval expedition in the sixteenth century with references to the Portuguese. I have not seen Vol. III., but I believe it contains a description of Bijápúr, and

possibly some other articles connected with the subject. I believe there are some articles in the Journal of the Bombay Geographical Society. The Journal of the Bombay Asiatic Society contains (1841) Translations from De Couto; (1844) Bird's description of Bījápúr; (1849) Maráthi works composed by the Portuguese; (1868) Translations of Portuguese Inscriptions found at Bombay.

* The Bombay Quarterly Review, vol. 4, contains an interesting article by the late Mr. Anderson regarding the capture of Bassein and other Portuguese forts between Bombay and Daman by the Maráthas. This, however, was in the eighteenth century, and our present review does not extend to a later date than 1663.

Doubtless there are numerous articles scattered through the Journals and Proceedings of the various Societies at Madras, Singapore, Batavia, Amsterdam, and Lisbon, but these I have not yet examined.

More valuable than most of the above, for our present purpose, is the "Chronista de Tissuary," a periodical which appeared at Goa under the editorship of Sr. Rivara, between 1866 and 1869. Every article in this is of value, though many refer to a period in the history of Portuguese India later than that under review. It contains among other papers an account of transactions with Adil Shah, treaties of peace with Jahángír and Sháh Jahán, descriptions of the Portuguese fortresses as they were in 1634, and notes of the inscriptions existing at the present day. Copies of the inscriptions with which the fortress of Díu is covered, have been published by Sr. Rivara in a separate pamphlet.

The "Gabinete Litterario das Fontainhas" appears to have been a similar periodical of earlier date. This statement, however, is subject to correction, as I have not seen the "Gabinete Litterario."

The above summary of authorities regarding Portuguese India has been prepared, partly from a list given me by Sr. Rivara, partly from Faria y Sousa, and partly from other books in my possession. Sr. Rivara who is a member of the Bombay Asiatic Society, will be able to enlarge the list and to correct any details that may be faulty where Portuguese authors are referred to. I hope he will do me this favour, and if Mr. Blochmann will kindly render the same service where Muhammadan authors are quoted, or where other information may be available in the Society's Library, it will be a great assistance to students interested in the subject.



Contributions to the Geography and History of Bengal (Muhammadan Period).—PART I., *Geographical*.—PART II., *Historical, based on Inscriptions received from* GENERAL A. CUNNINGHAM, C. S. I., DR. J. WISE, E. V. WESTMACOTT, ESQ., W. L. HEELEY, ESQ., WALTER M. BOURKE, ESQ., &c., *and on unpublished coins, with notes by* E. V. WESTMACOTT, ESQ., *and* DR. J. WISE.—By H. BLOCHMANN, M. A., *Calcutta Madrasah.*

In the end of last year, General Cunningham, Director of the Archaeological Survey of India, forwarded to the Asiatic Society, for publication in the Journal, a unique collection of rubbings of Muhammadan inscriptions from Bengal and various places up-country, and in the Proceedings of our Society for January last, I gave an account of the importance of these rubbings with reference to the history of Bengal. Dr. J. Wise of Dacca, Mr. Walter Bourke, Mr. E. V. Westmacott, C. S., and Mr. W. L. Heeley, C. S., have also favoured the Society with valuable rubbings and notes on the localities where they were obtained, and I shall delay no longer to carry out the wishes of the donors and publish my readings with a few notes suggested by the subject. I have also examined our coin cabinet, which I found to contain some unpublished Bengal coins of great value.

The importance of mural and medallie evidence for Bengal History arises from the paucity and meagreness of written sources. Whilst for the history of the Dili Empire we possess general and special histories, often the work of contemporaneous writers, we have only secondary sources and incidental remarks for the early Muhammadan period of Bengal, i. e., from A. D., 1203 to 1538. Nizamuddin Ahmad, who served Akbar as Bakhshi, the friend and protector of the historian Badáoni, is the first writer that gives in his *Tabaqat i Akbari*, which were completed in 1590, a short connected account of the independent kings of Bengal from 1338 to 1538. For the time between 1203 and 1338, we depend on incidental remarks made by Dili writers, as Minháj i Siráj, Barani, and 'Asif. Firishtah, who flourished in the beginning of the 17th century, has a chapter on the same period as Nizám; but though he gives a little more, it seems that he used the same, at present unknown, source as the author of the *Tabaqat i Akbari*. But there can be no doubt that this source was a work defective in chronology and meagre in details. Firishtah also cites a historical compilation by one Háji Muhammad of Qandahár, of which no copy is at present known to exist.

The latest writer on Bengal History is Ghulam Husain of Zaidpur, poetically styled 'Salim,' who composed his *Riyázu-s-salátn*, or 'the Gardens of Kings,' at the request of Mr. George Udney of Máldah. This work, the

title of which contains in the numerical value of the letters the date of its completion (A. H. 1202, or A. D. 1787-88), is rare, but is much prized as being the fullest account in Persian of the Muhammadan History of Bengal, which the author brings down to his own time. From a comparison of his work with that by Firishtah, it is evident that for the early portion he has used books which are likewise unknown at present, and it is unfortunate that his preface gives no information on this point.* His additional source, it is true, cannot have been a work of considerable size; yet he gives valuable dates which, as will be seen below, are often confirmed by collateral evidence. Salim has also made a fair use of the antiquities of the Gaur District. Stewart, who used the *Riyāz* as the basis of his History of Bengal, has given a translation of the greater part of the work; but from a leaning to Firishtah he has left out useful passages, which will be found below.

A commentary on Inscriptions necessarily contains references to the history and the geography of the country; but in order not to overload the subject with unconnected remarks, I have, in the following, separated the geographical from the historical portion, and have thus found means to collect, in a convenient way, numerous stray notes which for several years have been accumulating in the course of my historical studies.

* When quoting this unknown source, Salim uses phrases as '*di risālah e dākh-aw*,' 'I have seen in some pamphlet,' or '*bi-paṭh*,' 'according to another statement,' &c.

The Asiatic Society Library has one MS. of the *Riyāz-us-salātīn* (No. 526), written in bold *shikastah*, 277 pages, 8vo., 15 lines per page, copied in 1851 at Hajipur by one Sadrud-din Ahmad. Beginning—*Jahān jahān hamd azādār e bār-jāh ṣubhān-āfrīn-e asf, kuh in mazākir e kawn-e-rā ha-yul e qudrat e kānūn e khush-hishdyth e wajūd ṣubhalla sākhtih*, &c. The work consists of a Preface in four parts, and four Chapters, of which the last contains two parts. The end contains the following description of the character of the "new rulers"—

"The English among the Christians are adorned with the head-dress of wisdom and skill, and ornamented with the garb of generosity and good manners. In resolution, activity in war, and in festivities, in administering justice and helping the oppressed, they are unrivalled; and their truthfulness is so great, that they would not break a promise, should they even lose their lives. They admit no liar to their society, are pious, faithful, pitiful, and honorable. They have neither learnt the letters of deceit, nor have they read the page of vice; and though their religion is opposed to ours, they do not interfere with the religion, rites, and propagation of the Muhammadan faith.

گفتگوی کفر و دین آخر یکجا میکشد خواب یک خواب است باشد مختلف تعبیرها

All wrangling about faith and heresy leads to the same place: the dream is one and the same dream, though the interpretations may differ."

PART I.—GEOGRAPHICAL.

Before the conquest of Bengal by the Muhammadans under Bakhtyâr Khiljî in A. D. 1203, Bengal is said to have been divided into five districts—(1) Râḍha, the country west of the Húglî and south of the Ganges; (2) Bagḍî, the delta of the Ganges; (3) Banga, the country to the east of, and beyond, the delta; (4) Barendra, the country to the north of the Padma (Pôdda) and between the Karataya and the Mahánandâ rivers; and (5) Mithilâ, the country west of the Mahanandâ. We do not know whether these names refer to revenue districts, or merely indicate (as they now do) popular divisions based upon the course of principal rivers; but as the different orders of Brâhman and Kâyasths take their distinctive names from these divisions, it may be assumed that they existed or were recognized at the time of Ballala Sen, who classified the two castes.

The ease with which Bakhtyâr Khiljî took possession of Bengal by his surprise of Nadiya,* the then capital, stands unparalleled in history, unless we compare it with the almost peaceful transfer of the same country, five hundred and fifty-five years later, from the Muhammadans to the East India Company. But it would be wrong to believe that Bakhtyâr Khiljî conquered the whole of Bengal: he merely took possession of the south-eastern parts of Mithilâ, Barendra, the northern portions of Râḍha, and the north-western tracts of Bagḍî. This conquered territory received from its capital the name of Lak'hnauti, and its extent is described by the author of the *Tabaqât i Nâqiri*, who says that the country of Lak'hnauti lies to both sides of the Ganges and consists of two wings: the eastern one is called Barendra, to which Deokot belongs; and the western has the name of Râl [i. e., Râḍha], to which Lak'hnûr belongs. Hence the same writer also distinguishes† Lak'hnauti-Deokot from Lak'hnauti-Lak'hnûr. From the town of Lak'hnauti to Deokot on the one side, and from Lak'hnauti to the door of Lak'hnûr, on the other side, an embanked road (*pul*) passes, ten days' march. Distinct from the country of Lak'hnauti is Banga (*diḡr i Bang*, Bangadesh, *Tabaqât*, p. 267), and in this part of Bengal the descendants of the Lak'hmaniyah kings of Nadiyâ still reigned in A. H. 658, or 1260, A. D., when Minhâj i Sirâj, the author of the *Tabaqât*, wrote his history.‡ Deokot, which still gives name to a large parganah, was correctly identified by Buchanan with the old fort near Daudamâ, on the left bank of the Purnâ-

* Lak'hman Sen, the last king of Bengal, though called king, cannot have been much more than the principal zamindâr of his time. "He was a liberal man," says the author of the *Tabaqât*, "and never gave less than a lak'h of cowries, when he made a present—may God lessen his punishment in hell!"

† *Tabaqât*, pp. 162, 242.

‡ *Tabaqât Nâqiri*, p. 151. Thus an expedition against Banga by the governor of Lak'hnauti is mentioned in 657. *Tabaqât Nâqiri*, p. 267.

bhaba, south of Dínájpúr. Close to it lies Gangarámpúr with its ruins, and the oldest Muhammadan inscription known in Bengal.* Lak'hnúr,† the town or 'thanah' of the other "wing," has not yet been identified. The name occurs in no Muhammadan history after the time of the Ṭabaqát i Náqirí, and the only hint given is, that it lay west of the Húglí, on the road, at about the same distance from Lak'hnautí city as Deokot lay from the capital—which would be the northern portion of District Bírhmú.

Minhá's remark that Banga was, in 1260, still in the hands of Lak'hman Sen's descendants, is confirmed by the fact that Sunnārgāon is not mentioned in the Ṭabaqát; nor does it occur on the coins of the first century of Muhammadan rule. It is first mentioned in the *Tárikh i Baraní* as the residence, during Balban's reign, of an independent Rái; but under Tughluq Sháh (A. D. 1323), Sunnārgāon and Sāt-gāon, which likewise appears for the first time, are the seats of Muhammadan governors, the term 'Bangálah' being now applied to the united provinces of Lak'hnautí, Sāt-gāon, and Sunnārgāon.‡

The *Tárikh i Baraní*, the *Tárikh i Fírúzzsháhi* by 'Afif, and the *Travels of Ibn Baṭúṭah* yield but little additional information. Fírúzbád, or Paṇḍuah (north of Máldahá, or Máldah) which General Cunningham significantly calls 'Hazrat Paṇḍuah,' or 'Paṇḍuah, the Residence,' appears as the new capital, and in connexion with it Fort Ekdálah, said to be 'near Paṇḍuah.' The actual site of this fort is still a matter of doubt; even the

* Of Kai Káús Sháh, A. D. 1297. *Journal*, A. S. B., 1872, Pt. I., p. 102.

† Major Raverty, of whose translation of the Ṭabaqát two fasciculi have just appeared, informs me that all his best MSS. have لکھنور, Lak'hnúr. The *Bibliotheca Indica* edition has لکھنور, and often also لکھور; and it was, no doubt, the last spelling that led Stewart to substitute Nágor (in western Bírhmú), which certainly lies in the direction indicated. Outside of the Maráthá wall of Nagor, we have a Lak'hí-púr and a Lak'hínáráyanpúr.

‡ Baraní, p. 452. He spells Sāt-gāon, not Sāt-gāon. It is almost useless to remark on the geography of Bengal as given in the Ṭabaqát before the appearance of Major Raverty's translation, who has collated nearly all existing MSS. of the work. The *Bibliotheca Indica* edition is untrustworthy. Taking it, however, as it is, we find the following places mentioned—Núdiyah, in this spelling, for Nadiyá; Lak'hnautí; Banga; Bál (Bádha); Barendra; Lak'hnúr; Deokot; Narkotí (?), ديار كوني, ناركوتي, pp. 156 to 158; ككنوري, ككنوري, p. 158; مكيدة (?), and منطوس (perhaps سنترس), p. 158; Bangáon, p. 153; Fort Bishnkoṭ, founded by Husámuḍḍin 'Iwaz near Lak'hnautí, pp. 180, 243. Besides these, a few places are mentioned on the frontiers of Bengal, as Kámruḍ (always with this spelling) for Kámráp; ديار سكانات, Jagannáth (Pári) ?; and a few places in Kásem or Tibbat; اردو, p. 263; and Jájnnagar, regarding which vide below.

The *Tárikh i Firishtah* furnishes the isolated fact of the foundation of Rangpúr by Bakhtiyár Khiljí on the frontier of Bengal (Lucknow Edition, p. 298).

author of the *Riyāzussalāṭīn*, who lived in the neighbourhood of Māldah and Panduah, says nothing about it.*

About 850 A. H. (A. D. 1446), during the reign of Nāqiruddīn Mahmūd Shāh, the capital was transferred to Gaur. Thus Lak'hnauti is henceforth again called in history. The transfer, though it may have been connected with the restoration of an old dynasty, was unfortunate. Gaur lies in the middle between the Ganges and the Mahānandā, thus occupying, as is the case in all Deltaic lands, the lowest site; and east of it lies the Kallak Sajā marsh, called in the *Āin Chuttiā-pattiā*, into which the drainage of the town opened. Every increase in the waters of the Ganges caused the marsh, which is connected with it, to rise, and "if the [earthen] embankment broke, the town was under water,"† and the drainage was driven back into the town. Hence the removal of the capital, a short time afterwards, to Tindāh,‡ and the ultimate desertion of the town as a fever centre for Rāj-mahall.

The meagre information supplied by the Ṭabaqāt i Nizāmī and Firish-tah throws no further light on the geography of Bengal, but leaves the impression that during the reigns of the independent kings (A. H. 739 to 911, or A. D. 1338 to 1535) the extent of Muhammadan Bengal was the same as what we find it in A. D. 1542, the year in which Todar Mall prepared his rent-roll of Bengal, a copy of which Abul Fazl has given in the *Āin*.

The coins and inscriptions of the above period yield a few particulars. We have the seven Bengal mint towns given by Thomas,§ to which I can

* Mr. Thomas compares with Ekdālah the name of 'Jugdula,' a village east of Hazrat Panduah, towards the Purnābhāba. The Indian Atlas Sheet No. 119 also mentions a village Jagdal due north of Māldahā, near the Mahānandā, in Lat. 25° 17' 30", and a 'Jugdāl' and a 'Jugdāl' will be found south-east of Gaur, Long. 88° 28', Lat. 24° 42'. Even in other parts the name is common; for Jagdal is the Bengālī 'Jogoddul,' 'a leaf of the world,' the world being the lotus, and each town a petal of it. Another Ekdālah will be found on the same sheet, south-east of Bogra (Bagurā), Long. 89° 40' 30", Lat. 21° 33' 15", and a third is in Rājshāhī, a little south-west of Nātor. The name seems to be the Bangālī *জগদাল*, 'having one wing;' and Dodālā 'having two wings,' occurs likewise as a name of villages.

† *Āin i Akbarī*.

‡ Rennell marks 'Tarāh' near the Paglā River (a branch of the Ganges and perhaps the old bed of the river), south-west of the fort of Gaur. "Tanda standeth from the river Ganges a league, because in times past the river flowing over the bankes, in time of rains did drowne the countrey and many villages, and so they do remaine. And the old way the river Ganges was wont to run, remaineth drie, which is the occasion that the citie doeth stand so farre from the water." Ralph Fitch.

The losses of Akbar's Bengal army in Gaur will be found in my *Āin translation*, p. 278.

§ Lak'hnauti, Frūsābād (Panduah), Sātgaon, Shahr i Nau (P), Shāyān, Sunnārgaon, and Mu'assamābād. *Chronicles*, p. 151.

now add three more, *viz.* Fathábád, Khalífatábád, and Husainábád, which will be discussed below. The inscriptions reveal the important fact, that Bengal was divided into revenue divisions called Mahalls, over which, as in the Dihli empire, Shiqdárs* were placed, and into larger circles under 'Sarlashkars,' or military commanders, who have often also the title of Vazír (Diwan). Of places mentioned on inscriptions I may cite—Iqlím Mu'azzamábád (Eastern Maimansingh); Thanah Láur (north-western Silhat,—both occur also united under the same Sarlashkar); Sarhat, in western Bírhmú, now in the Santal Parganahs; Láopallab, east of the Island in the Húglí opposite Tribení Ghát, evidently in olden times an important place as lying at the point where the Jabuná leaves the Húglí and commences her tortuous course, first easterly, then southerly, into the Sundarban;† and also several places which have not yet been identified, as Simlábád, Hádígarh, and Sájlá-Mankhibád.‡

From the middle of the 16th century we have the works and maps of Portuguese historians, notably the classical 'Da Asia' by Joao de Barros (died 1570); and the graphic descriptions of Cæsar Frederick (1570) and Ralph Fitch (1583 to 1591). Nor must I forget the Persian traveller Amín Rázi, an uncle of Núr Jahán, who composed his 'Haft Iqlím' in A. H. 1002 (A. D. 1594); but it is doubtful whether he visited Bengal, or merely wrote down what he heard at Ágrah. I shall occasionally refer to the works of these travellers below.§

But by far the most interesting contribution to the geography of Bengal, in spite of the unsatisfactory state of the MSS., is Todar Mall's rent-roll. Though of 1582, it may be assumed that Todar Mall merely gave in it what he found to exist with regard to both divisions and revenue; for Bengal was only subjugated during Jahángir's reign, and properly assessed

* How extensively the Hindús were employed as revenue officers may be seen from the fact that the Arabic-Persian *Shiqdár* and *Muzmá'ulár* have become Bangalí family names, generally spelt 'Sikdar' and 'Mozzondar.'

† The island opposite Tribení has a conspicuous place on De Barros' Map of Bengal and on that by Blaev (*vide* Pl. IV.). The maps also agree with Abul Fazl's statement in the *Ain*, that at Tribení there are three branches, one the Saraswatí, on which Sâtágón lies; the other, the Ganga, now called the Húglí; and the third, the Jon or Jabuná (Jamuná). De Barros and Blaev's Maps shew the three branches of almost equal thickness, the Saraswatí passing Satigam (Sâtágón), and Chonma (Chamuhá in Húglí District, north), and the Jabuná flowing westwards to Buram (Borhan, in the 24-Parganahs).

‡ Journal, A. S. Bengal, 1870, Pt. I., p. 284.

§ I have not mentioned Nicoldé de Conti's Travels (1419 to 1444, A. D.), because he only mentions one town in Bengal, *Cornove* on the Ganges, which Col. Yule has identified with the 'Shahr i Nau,' or 'New Town' on Sikandar Sháh's coin of 1379 (Thomas, In. Coinage of Bengal, Journal, A. S. Bengal, 1867, p. 65); but the position of this town is still a matter of doubt.

by Prince Shujá' a short time before 1658. In the *Áin* we find that Bengal proper was divided into 19 Sirkárs, and 682 Mahalls. Eight of the 19 Sirkárs, and 204 of the 682 Mahalls, have Muhammadan names. The rent-roll included both the *khálicah* ('genuine,' *vulgo* khalsa) or crownlands, and the *aqtá* or *jágír* lands, i. e. lands assigned to officers in lieu of pay or maintenance of troops. The distribution of the Sirkárs depended, as in the old Hindú division, on the courses of the Ganges, Bhagirathí, and Megna, or, as the *Áin* expresses it, on the courses of the Padmáwatí, Ganga, and Brahmaputra, as will be seen from the following list of the Sirkárs.

A. Sirkárs North and East of the Ganges.

1. Sirkár Lak'hnaúti, or Jannatábád, extending from Taliágarhí (K'halgáon, Colgong) along the northern banks of the Ganges, and including a few mahalls now belonging to district Bhágálpúr and Púrniah, and nearly the whole of Máldah district. Besides Gaur, this Sirkár contained the ancient town of Ráuginaúti.* 66 mahalls; khalsa revenue, Rs. 471,174.†

2. Sirkár Púrniah, or Púranuah, the greater and chiefly westerly portion of the present district of Púrniah, as far as the Mahánanda.‡ 9 mahalls; revenue Rs. 160,219.

3. Sirkár Tájjpúr, extending over Eastern Púrniah east of the Mahánanda, and Western Dinájpúr. 29 mahalls; revenue, Rs. 162,096.

4. Sirkár Panjrah, so called from the Hawelí mahall Panjrah, north-east of the town of Dinájpúr, on the Atrai River, comprising the greater part of Dinájpúr district. 21 mahalls; revenue, Rs. 145,081.

5. Sirkár G'horág'hát, so called from the town of G'horág'hát or Chaul'handí on the right bank of the Karatayá, comprising portions of Dinájpúr, Rangpúr, and Bagurá (Bograh) districts, as far as the Brahmaputra. Being a frontier district towards Koch Bihár and Koch Hájo, it contained numerous jágír lands of Afghán chiefs and their descendants. The Sirkár produced a great deal of raw silk. 88 mahalls; revenue, Rs. 202,077.§

6. Sirkár Bárbakábád, so called from Bárbak Sháh, king of Bengal (*vide* below), and extending from Sirkár Lak'hnaúti along the Podda to Bagurá. It comprises portions of Máldah and Dinájpúr, and a large part of Rájsháhí, and Bagurá. Its cloths were well known, especially the stuffs

* Máldah is once mentioned in the *Tuzuk i Jahángír* (p. 178)—"When I [Jahángír] was prince, I had made a promise to Mir Ziyáuddin of Qazwín, a Saifi Sayyid, who had since received the title of Muçtafá Khán, to give him and his children Parganah Máldah, a well known Parganah in Bengal. This promise was now performed (A. D. 1617).

† Akbarsháhí Rupees (1 Rupee = 40 dáms). Grant substitutes 'Sicca Rupees,' at 2s. 3d.

‡ It seems as if the Mahánanda, in its upper course, is often called Mahánadi. Van den Broucke calls it on his map 'Martnado.'

§ Some MSS. have 209,577 Rs.

called *khāṣah* (the “koses” of old writers) as the *khāṣah* of Shabbāzpūr, the *ṣahan* (صحن, the ‘sanēs,’ or ‘sahnēs’ of Dutch writers), and the *mūmīnī*. 38 mahalls; revenue, Rs. 436,288.

7. Sirkār Bāzūhā, extending from the preceding across the Brahmaputra into Silhaṭ, comprising portions of Rājshāhī, Bagurā, Pabnā, Maiman Singh, and reaching in the south a little beyond the town of Dhākā (Dacca).^{*} The name ‘Bāzūhā’ is the plural of the Persian word *bāzū*, ‘an arm, a wing;’ and all mahalls in this Sirkār have the word *bāzū* after their name, which on our survey maps appears under the Bangālī form ‘Bajoo.’† 32 mahalls; revenue, the largest of all Sirkārs, Rs. 987,921. To this Sirkār belonged Dhākā, and Sherpūr Murcha, or Mihmānshāhī, south of Bagurā on the Karataya, which is several times mentioned in the Akbarnāmah as a military station.

8. Sirkār Silhaṭ, adjacent to the preceding, chiefly east of the Surmā River. As will be seen below, the country was only conquered by the Muhammadans in the end of the 11th century, and was exposed to continual invasions from Tiparah and Āśām. According to Marco Polo, the Āin, and the Tuzuk, Silhaṭ supplied India with eunuchs. Jahāngīr issued an edict forbidding the people of Silhaṭ to castrate boys. Like Kāmṛp, Silhaṭ is also often mentioned as the land of wizards and witches, and the fame of its *jādū*, or witchcraft, is still remembered at the present day. 8 mahalls; revenue, Rs. 167,032.

9. Sirkār Sunnārgāon, to both sides of the Megna and the Brahmaputra, containing portions of western Tiparah, Dhaluā, and Noāk'hālī, subject to repeated attacks by the Rajahs of Tiparah and Arakan. 52 mahalls; revenue, Rs. 258,293. The *Haft Iqlīm* gives Rs. 330,000.

^{*} Stewart says that Dhākā is a modern town, “because the name does not occur in the Āin.” But it does; *vide* my text edition, p. 407, where the Mahall to which it belongs, is called Dhakkā Bāzū. In Gladwin's spelling ‘Dukha Bazoo’ it is, however, scarcely recognizable. Dhākā occurs in the Akbarnāmah as an Imperial tēnah in 1584; and Sir A. Phayre (*vide* above, p. 53) mentions it in 1400.

† Thus the country west of Pabna is called ‘Bajooras’ and east of it ‘Bajoochup’—corruptions of *Bāzū i dāst*, ‘the right wing,’ and *Bāzū i chap* ‘the left wing.’ Other corruptions are—Esub, or Eshub, or Esop, or Isaf, for ‘Yūsuf;’ thus ‘Esubshye,’ for ‘Yūsuf-shāhī;’ Nasipore, for Nasīb-pūr, (from Naṣīb Shāh); Nujeeppore, for Najīb-pūr; Haleeshur (opposite Tribeni) for Hālāshahr, = Hawelī i Shahr [Sāt-gāon]; Mahomedshye for Mahmūdshāhī, (Jessore); Bajitpore, for Bāyazīdpūr (in Dīnāj-pūr); Juffurshye, for Zafarshāhī, (not Ja'farshāhī); Kali Modunpūr (which sounds like a Hindū name), Kalīm-uddīn-pūr; Puladasey, north of Bagurā, for Fūlādshāhī; Masidpore and Majidpore, for Masjid-pūr (*vide* Beames, Comp. Grammar, p. 209).

In the spelling of Bengal names care should be taken with the frequent ending *daha*, ‘eddy,’ as Māldahā, spelt in Persian Māldah; but the final h is radical, and the name should not be spelt Māldā, as Mālwah, Rājah, &c., = Mālwā, Rājā, &c.

Aurangzib forbade by edict spellings like Mālwah, Rājah, &c.; he wanted people to spell Mālwā, Rājā.

10. Sirkár Chátgáon (Chittagong), never properly annexed before the reign of Aurangzib. 7 mahalls; revenue, Rs. 285,607.

B. Sirkárs in the Delta of the Ganges.

11. Sirkár Sátgáon. A small portion only, the land between the Húglí and the Saraswatí, lay west of the Húglí, whilst the bulk of the Sirkár comprised the modern district of the 24-Parganahs to the Kabadak, western Nadiyá, south-western Murshidábád, and extended in the south to Hatiágárh below Diamond Harbour. To this Sirkár belonged Mahall Kalkattá (Calcutta) which, together with two other mauza's, paid, in 1582, a land revenue of Rs. 23,905. 53 mahalls; revenue, Rs. 418,118.

12. Sirkár Mahmúdábád, so called after one of the three Mahmúd Sháhs of Bengal, and comprising northern Nadiyá, northern Jessore, and western Farídpúr. 88 mahalls; revenue, Rs. 290,256.

13. Sirkár Khalífatábád, or southern Jessore and western Báqiranj. The Sirkár is called after Khalífatábád, which was the name of the small Hawelí-parganah near Bágherhát (*vide* below). The largest mahall of this Sirkár was Jesar (Jessore), or Rasúlpúr; and among others, we find here the Mahalls Múndagáchha and Malikpúr, which the Khán i A'zam, when governor of Bengal under Akbar (*Ain* translation, p. 326), is said to have given to Bhabeshwar Rái, the ancestor of the present Rájahs of Jesar. The name of Jesar, therefore, occurs as early in 1582; hence Van den Broucke's map (1660) also gives it conspicuously as 'Jessore.* 35 mahalls; revenue, Rs. 135,053.

14. Sirkár Fathábád, so called after Fath Sháh, king of Bengal, comprising a small portion of Jessore, the whole of Farídpúr, southern Báqiranj, portions of Dháká district, and the Islands of Dak'hin Shahbázpúr, Sondíp, and Sidhú, at the mouth of the Megna. The town of Farídpúr lies in the Hawelí Parganah of Fathábád. 3 mahalls, revenue, Rs. 199,239.

15. Sirkár Baklá,† or Ismá'ílápúr, north-east of the preceding, comprising portions of Báqiranj and Dháká districts. It is the *Bacala* of old maps. 4 mahalls; revenue, Rs. 178,756.

C. Sirkárs South of the Ganges and West of the Bhagirathi (Húglí).

16. Sirkár Audambar, or Tánqah, comprising the greater portion of Murshidábád district, with portions of Bírblhúm. The name Audambar occurs also in other parts of India, *e. g.* in Kachh.‡ Tánqah did not long enjoy the position of capital: Sher Sháh already had made plans to remove it

* *Vide*, however, Westland, Jessore Report, p. 29.

† The author of the *Siyarul Mutaakikharín* calls it Hoglá (هوجلہ), from the Bangálí word *hoglá*, which signifies marsh reed—a name which no doubt explains the name of Húglí; but he strangely confounds Sirkár Baklá with Sirkár Sátgáon (Húglí).

‡ *Vide* Cunningham, *Ancient Geography of India*, I, p. 248.

to *Ag Mahall* on the opposite bank. But this was only carried out by *Rájah Mán Singh*, who changed the name of *Ag Mahall* to *Ráj Mahall*, and subsequently to *Akbarnagar*. The same *Sirkár* became again in later times under Prince *Shujá* the seat of government, and later still under *Nawáb Jafar Murshíd Qulí Khán*, who changed the name of the old town of *Makhçúçábád*,* the *Muxabad* or *Muzadabad* of old maps, to *Murshidábád*. 52 mahalls; revenue, Rs. 601,985. The *Haft Iqlim* gives its revenue at Rs. 597,570.

17. *Sirkár Sharífábád*, south of the preceding, comprising the remaining portions of *Bírbhúm*, and a large portion of *Bardwán* district, together with the town of *Bardwán*† itself. Mahalls *Bárbak Singh* and *Fath Singh*, so called after the Bengal kings *Bárbak Sháh* and *Fath Sháh*, and *Sherpúr 'Atái*, where *Mán Singh* defeated the *Afgháns* (*Aín* translation, p. 341) also belonged to this *Sirkár*. 26 mahalls; revenue, Rs. 562,218.

18. *Sirkár Sulaimánábád*, a straggling *Sirkár*, which comprised a few southern parganahs in the modern districts of *Nadiyá*, *Bardwán*, and the whole north of *Húgli* district. This *Sirkar* was so called after *Sulaimán Sháh* of Bengal, who also called several parganahs after himself in *Murshidábád*, *Jessore*, and *Báqirganj* districts; but whether the name was too long, or was purposely changed after *Akbar's* conquest of Bengal in honor of Prince *Salím* (*Jahángír*), it only occurs now-a-days in the form '*Salímábád*.' The chief town of the *Sirkár* was *Salímábád* [*Sulaimánábád*], on the left bank of the *Damúdar*, south-east of the town of *Bardwán*. It is marked as '*Silimath*' on *Van den Broucke's* map. *Olá* (the old name of *Birnagar*) in *Nadiyá*, known from the *Srimanta* legend, and *Pañduah*, on the *E. I. Railway*, with its Buddhist ruins and ancient mosques, also belong to this *Sirkár*. 31 mahalls; revenue, Rs. 440,749.

19. *Sirkár Madáran*, extending in a semicircle from *Nágor* in Western *Bírbhúm* over *Rániganj* along the *Damúdar* to above *Bardwán*, and from there over *K'hand Ghosh*, *Jahánábád*, *Chandrakouá* (Western *Húgli* District) to *Mandalg'hát*, at the mouth of the *Kúpnaráyan* River. 16 mahalls; revenue, Rs. 235,085.

Thus the above nineteen *Sirkárs*, which made up Bengal in 1582, paid a revenue on *khalsa* lands, inclusive of a few duties on salt, *háts*, and

* The *Akbarnámah* mentions a *Makhçúc Khán*, brother of *Sa'id Khán*; vide my *Aín* translation, p. 388. *Makhçúc Khán* served in Bengal and *Bihár*, and his brother *Sa'id Khán* was for some time governor of Bengal.

† The Muhammadan pronunciation of the Bangálí *Borimán*. The *Haft Iqlim* mentions an extraordinary custom that obtained in this *Sirkár*. "*Femineæ hujus provincie instrumentum quoddam fictile penis instar in vulvam et in anum inferunt, ut sordes removeant. The old kings have in vain tried to break them off this habit.*"

Regarding the Muhammadan antiquities of *Bardwán*, vide *Journal, As. Bengal*, for 1871, Pt. I, p. 254.

fisheries, of 259,482,106 *dáms*, or Rs. 6,837,052.* According to Grant, the value of the *jágir* lands was fixed at Rs. 4,348,892, so that we have, in 1582, A. D., as total revenue of Bengal, in its then circumscribed limits, the sum of Rs. 10,685,944. This was levied from the *ryots* in specie† as the equivalent of the *rub'*, or fourth share, of the entire produce of the land, claimed by the sovereign as despotic proprietary lord of the soil.

This rent-roll remained in force during the reign of Jahángír. The remittances from Bengal to Dilií were, it is true, not very regular, nor up to the sums levied, so much so that Jahángír appointed, in the end of his reign, Fidái Khán, governor of Bengal, merely because he promised to send regularly one million of rupees to court. Under Sháhjahán, the boundaries of Bengal were extended in the South-West, Medinipúr and Hijli having been attached to Bengal, and in the East and North-East by conquests in Tiparúh and Koch Hájo; and when Prince Shujá' was made governor, he made, shortly before 1658, a new rent-roll, which shewed 34 *Sirkárs* and 1350 *Mahalls*, and a total of revenue, on *khalsa* and *jágir* lands, of Rs. 13,115 907. Shujá's rent-roll remained in force till 1722, an addition having been made after the conquest of Chátgáon. In that year, Nawáb Ja'far Khán (Murshid Qulí Khán) issued his *Kámil Jama' Tumári*, or 'Perfect Rent-roll,' in which Bengal was divided into 34 *Sirkárs*, forming 13 *Chaklahs*, and sub-divided into 1660 *Parganahs*, with a revenue of Rs. 14,288,186.

It was, however, only after the rule of Nawáb Ja'far Khán that the *Abwáb* revenue‡ gradually appeared in the books. Though vast sums had been levied on this head, they had been looked upon as private emoluments of office. As early as in the tenure of Shujá' Khán, Nawáb Ja'far's successor, we find the *Abwábs* entered as yielding Rs. 2,172,952, and they rapidly increased under 'Alí Virdí Khán and Qásim Khán, so that, when the E. I. Company in 1765 acquired the *Diwání*, the *net* amount of all revenue collected by authority in Bengal was Rs. 25,624,223.

It is not my intention to enter here further in the historical portion of the revenue question of Bengal, nor shall I minutely describe the *Sirkárs* and the *Mahalls* or detail the historical and geographical

* Grant's total is Rs. 6,344,260, or Rs. 7,208 more, chiefly on account of the higher sum given by him for *Sirkár G'horág'háť*. Vth Report, p. 258.

† "The *ryots* (*ra'yyat*) of Bengal are obedient and ready to pay taxes. During eight months of the year they pay the required sums by instalments. They personally bring the money in *rupees* and *goldmuhurs* to the appointed place. Payment in kind is not usual. Grain is always cheap. The people do not object to a survey of the lands, and the amount of the land tax is settled by the collector and the *ryot* (*nasaq*). His Majesty, from kindness, has not altered this system." *Áin i Akbari*.

‡ Imposts as fees on the renewal of annual leases of *zamíndárs* (*khánawáns*); *nagránahs*; fees for remission of imperial revenue; *zar i mahaut*, or imposts levied for the maintenance of the Nawáb's elephants; and many more.

changes that took place; these I must necessarily reserve for the second volume of my *Āin* translation. But I shall now attempt to trace the frontiers of Bengal under the Muhammadan rule as far as existing historical sources allow us to do.

The Frontiers of Muhammadan Bengal.

Abulfazl estimates the breadth of Bengal from Garhī to Chátgāon at four hundred *kos*. From north to south, the longest line was from Koch Bihār to Chittúá in Sirkár Medinípúr. "The zamindárs are mostly Káyasths." Not a word is said on the strength of the Muhammadan population, or the progress of Islám—comparative statistics were not thought of in his age. The remark made by old English travellers that the inhabitants of the islands and the coast of south-eastern Bengal were chiefly Muhammadans, and the uncertain legend regarding the introduction, in the beginning of the 16th century, of Islamitic rites into Chátgāon by Nuṣrat Sháh are the only allusions that I have seen on the subject. Neither history nor legends allude to the conversions among the semi-aboriginal rural population, that must on a large scale have taken place during the reigns of the independent kings of Bengal, chiefly, no doubt, through the exertions of the numerous Afghán Jágírlárs.

The military and naval power of the country is fixed at 23,330 horse, 4,260 guns, 1,170 elephants, and 1,400 boats. In Nawab Ja'far's rent-roll, however, the strength of the naval establishment (*nawárá*) consisted of 768 armed cruisers and boats, which were principally stationed at Dháká, to guard the coast against the Mags and foreign pirates; and the number of sailors included 923 Firingís, chiefly employed as gunners. The annual charges of the navy, including construction and repairs, was fixed at Rs. 813,452, which was levied under the name of '*amalah i nawárá*' from parganahs in South-Eastern Bengal. The same rent-roll mentions that the garrisons along the whole eastern frontier from Chátgāon to Rángamátí on the Brahmaputra consisted of 8,112 men (*akshám*), who cost 359,180, Rs. per annum.

Of the roads in Bengal we have no information prior to Van den Broucke's map (1660) in Valentyn's work. He marks (1) a principal road passing over Patna, Munger, and Rájmahall to Sútí, where the Bhagirathí leaves the Ganges. From here a branch went to Moxudabath (Murshidábád), Plassi (Palásí), and Hagdia,* crossed the Bhagirathí for Gasiapoor,

* Hagdia is Agardíp. Van den Broucke's map gives here an interesting particular. He marks Hagdia on the left bank of the river, and Gasiapoor (Ghásípúr) on the right bank. Both places lie now far from the right bank, with only a small k'hál between them, and a large semi-circular lake round both. The lake, as else-

and passed on to Bardwán, Medinipúr, Bhadrak (wrongly marked on the right bank of the Baitaraní), and Katak. The other branch went from Sútí along the right bank of the Podda to Fathábád, from where it passed on to Dháká. These two branches are marked as principal roads (*sháhí rastah*). (2)* A road from Bardwán to Baccareoor (Baklesar in Bírghúm, famous for its hot springs, within the Marátha Intrenchment of Nágór), and from there to Qásimbázár and the banks of the Ganges, and across the river to 'Hasiaarhati.' This is Hajrahattí, on the left bank of the Podda, now also a ferry place, near the entrance of the Burul River, below Rámpúr Boáliá, and seems to be the Qázihattí (Beng. Kajierhattí), which Abulfazl mentions in the *Aín*. From Hasiaarhati the road passed to a place called Harwa, and from there to Cerpoo Mirts, *i. e.* Sherpúr Murchah, on the Karataya, and passing over Tessiadin (Chandíjan, north of Sherpúr, ?) to Gorregaut (G'horág'hát) and Bareithela (Baritalá) on the Brahmaputra, which will be mentioned below as a frontier town. (3) A road from Bardwán over Salmábád, Hughli, Jessore, Bohnah, Fathábád, across the river to Sjatrapoor,* Casisella, and Idrákpúr, opposite the confluence of the Lak'há and the Dalásari, near Ballál Sen's palace. (4) A road from Dháká, across the Dalásari to Piaarpoo and Bedlia, which latter place is marked at the point where the Dalásari leaves the Jamuná, and from there to Sasiadpoor (Shahzádpúr, in Pabnah), and Handiael (Hariál).

The Western Frontier.

In the north-west, the frontier of Bengal extended but little beyond the Kosí River; but under some of the early Muhammadan governors and the independent kings, the Bengal empire included all upper Bihar north of the Ganges as far as Sárán. Of Ilyás Sháh, for example, it is asserted that he was the founder of Hájípúr, opposite Patna, on the Ghandak, although Firúz Sháh, on his return from Bengal, appointed for the first time Imperial collectors in Tirhut. Sikandar Sháh's coins, again, have been found far west of the Kúsi.

Southern Bihár only belonged to Bengal from the time of the conquest by Bakhtiyár Khiljí to about 730 A. H. (A. D. 1330), when Muhammad Tughluq annexed it to Dihli. From 800 again (A. D. 1397), the whole of Bihár belonged to the kingdom of Jaumpúr. Under Buhlúl again, Daryá Khán Lohání was governor of Bihár; and under Ibráhím, Daryá's son Bahádur Khán assumed independence in Bihár under the title of Sháh Muham-

where in Bengal, is the old bed of the river, which now follows the shorter route along the chord of the loop. This change, therefore, took place after 1660.

Thus also Nadiyá lies now on the right bank of the river; but west of the town, there is still the old channel, which goes by the name of Ganga Bhárat.

* Rennel gives Sutarepur; but modern maps give no such name.

mad.* It is not clear how far these Afghán chiefs depended on Husain Sháh of Bengal, whom inscriptions represent firmly established in 908 at Muñger, while other inscriptions from Bonhárá and Cheran (near Sárán) would lead us to conclude that the whole of Upper Bihár and the western portions of Southern Bihár belonged to him in A. H. 908 and 909 (A. D. 1502, 1503). On the other hand, we hear in history of the cession by Husain Sháh of Bihar, Sárán, and Tirhut, and of the reconquest of these lands by Nuçrat Sháh, who, if he could not hold them, assisted the Afgháns against Bábar. Nuçrat Sháh seems even to have passed beyond the Ghandak; for a mosque near Sikandarpúr, on the right bank of the river, in District A'zamgarh, was built during his reign.

South of the Ganges, the western frontier is better defined. Fort Taliágarh, or Garhí,† near K'halgáon (Colgong) on the Ganges, was looked upon as the entrance, or key, to Bengal—a position which Muhammadan historians compare with that of Fort Sahwán on the Indus, the key of Sindh. From Garhí the frontier passed along the Ganges to the south of Ag-Mahall (Káj Mahall), when it again turned westward to north-western Bírghúm, passing along the boundary of the modern Santál Parganahs to the confluence of the Barákar and the Damúdar, from where it went along the left bank of the Damúdar to the neighbourhood of the town of Bardwán. From here the frontier took again a westerly direction, and passed along the north-western and western boundaries of the modern Húglí and Habrah (Howrah) Districts down to Mandalg'hát, where the Rúpnaráyan flows into the Húglí River.

This boundary, it will be seen, excludes the whole of the Santál Parganahs from the south of K'halgáon to the Barákar, Pachet,‡ and the territory of the Rájahs of Bishnpúr (Bankurá). In vain do we look in Santalia for Muhammadan names of villages and towns; and though there can be no doubt that the Muhammadan kings of Bengal tried to hold parts of the hills by establishing thánahs and appointing jágirholders, no permanent settlements were formed. One of the most westerly thánahs in southern Santalia was Sarhat, N. W. of Shiúrí (Soory) in Bírghúm, which is mentioned in Tribení inscriptions;§ whilst the settlement of Pathán

* Called in many MSS. Mahmúd.

† It is not known which king built the fort; but it may be accidental that the name does not occur in the Tabaqát i Náçirí and in Baraui. At K'halgáon, Mahmúd Sháh III., the last independent king of Bengal, died in 945 (1538 A. D.).

‡ Regarding the invasion of Chutiá Nágpúr by the Muhammadans, vide J. A. S. B., 1871, Part I, p. 111.

§ Sarhat, spelt on inscriptions Sirhat, lies on the left bank of the Ajai River. Its name on modern maps is corrupted to Saruth. Bennell has Sarhaut. Outside the place, the survey maps mark two old forts. A little to the south of it, a village of the name of Lukrakhonda is marked. Bennell on his map of Bírghúm (Bengal Atlas,

jágírdárs, before and after the time of Sher Sháh, as a standing militia against the inroads of the tribes of Jhárk'hand (Chutiá Nágpúr), led to the formation of the great Muhammadan zamíndári of Bírghúm, which gave the E. I. Company some trouble.

In Todar Mall's rent-roll the following Mahalls are mentioned along this portion of the western frontier of Bengal—Ág Mahall (Rájmahall), Kámkjol, Kuṇwar Partáh, Molesar,* in Sirkár Audambar or Tánḍah; Bharkúndah, Akbarsháhi, Kaṭangah, in Sharifábád (Bírghúm); Nágor, Sainbhúm, Shergaṛh (Rúniganj), Champánagari (N. W. of the town of Bardwán), Madáran (Jahánábád and Chandrakoná, west of Húgli), Chittúá (District Medinipur), and Mandalghát, at the mouth of the Rúpnráyan, all belonging to Sirkár Madáran.

The name of the frontier mahall of B h a r k ú n d a h in Bírghúm, mentioned above, seems to have been formerly extended to the whole of Bírghúm and the Santál Parganahs. In this extended sense, it is used in the *Táríkh i Dáúdí*,† on De Barros' map of Bengal, and on Blaeu's map of India (*vide* Pl. IV). In the latter, it is only given as 'Barcunda,' but in the former as 'Reino de Barcunda,' extending from Ferrandus (a corruption of Bardwán) to Gorij, in which we recognize Garhi, the 'key of Bengal.' West of Barcunda, De Blaeu and De Barros give 'Patanes,' i. e. the Patháns, the military and semi-independent landholders of the western Bengal frontier. On the Ganges, both maps shew Gouro (Gaur), and opposite to it, 'Para', for which De Barros gives 'Rara.'‡ Both spellings may be mistakes for Tara, i. e. Tánḍah, which should of course be on the other side of the river; or 'Rara' stands for the old Hindú division of Rádha, which there commences. South of 'Ferrandus,' the old maps give 'Mandaram' and 'Cospetir,' which latter name is wrongly placed on Blaeu's map north of Mandaram, whilst De Barros has it correctly west of it. In Mandaram we recognize Madáran, the chief town of Sirkár Madáran, a name which even now-a-days is pronounced by the peasants Mandáran.§ 'Cospetir,' or De

No. II.) places a 'Lacaracound,' in conspicuous letters, south of Nágor; but modern maps give no such locality. Could this be the Lak'hnúr of the Tabaqat?

* *Sábiq* (i. e. former) Molesar and Darín Molesar. The former name is wrong spelt in the Indian Atlas (Sheet 113) Sarik Molissor.

† Dowson, Elliot's History of India, IV., pp. 360, 364.

‡ South of Para or Rara, Blaeu and De Barros give a place of the name of Moulamadangur; and below Gouro, Patana or Patona, and Moneitipur, which I have not identified.

§ I have identified Madáran with Bhitargaṛh in Jahánábád, in the north-western corner of Húgli District. *Vide* Proceedings, As. Socy. Bengal, for April, 1870, where the legends of the place are given.

As the name of Jahánábád occurs in the Akbarnámah, it has no connexion with Sháhjahán's name, but refers more likely to one of the numerous Khán Jaháns of the Pathán rule.

Barros' 'Reino Cospetir,' a name that puzzled me long, is clearly 'the kingdom of the Gajpatí,' or Lord of elephants, the title of the kings of Orísá, the final *r* being nothing but the ending of the Bangálí genitive. Sirkár Madáran was indeed the frontier of Orísá; but if the legends of the Húglí District speak of the Gajpatís having once extended their kingdom to the Ganges (Húglí River), it must have been prior to the time when Sâtgaón became the seat of Muhammadan governors.

It is remarkable that among the names of the jungly and hilly frontier districts, we find so many ending in *bhúm*. Thus we have Bírbbhúm;* Sainbhúm, along the left bank of the Ajai, in Bírbbhúm district; Sik'harbhúm or Shergarh, the mahall to which Rániganj belongs; Gopíbhúm, along the right bank of the Ajai; Bámanbhúm or Bráhmaṇbhúm, in northern Medinípúr District; Mánbhúm, Baráhbhúm, Dhalbhúm, Singbhúm, in Chutiá Nággpúr; Túnbhúm, in southern Parúliá; Malbhúm, the frontier of Bardwán and Medinípúr Districts; Bhanjibhúm, with the town of Medinípúr;† &c. Similarly, the frontier district between Rangpúr and the Brahmaputra, comprising Mahalls Bhitarband and Bahirband, is called in Shujá's rent-roll 'Bangálbhúm.'

I mentioned Mahall Mandalg'hát at the confluence of the Rúpnaráyan and the Húglí as the south-western frontier of Bengal. The Districts of Medinípúr and Hijlí (south-east of Medinípúr) were therefore excluded. They belonged to the kingdom of Orísá till A. H. 975, or A. D. 1567,‡ when Sulaimán, king of Bengal, and his general Kálá Pahár defeated Mukund Deb, the last Gajpatí. Even after the Afghán conquest, Medinípúr and Hijlí continued to belong to the province of Orísá, when Khán Jahán Afghán was appointed by Dáúd Sháh governor of Orísá, Qutlú Khán Lohání being made governor of Púri. On the 20th Zí Qa'dah, 982, (3rd March, 1575) Mun'im Khán Khánán, Akbar's general, defeated Dáúd Sháh at Tukarói or Mughulmári, north of Jalesar, and in the peace of Katak, in the beginning of 983, Bihár and Bengal were ceded. In 984, Dáúd again invaded Lower Bengal, but was defeated and killed on the 15th Rabí' II, 984, near Ág Mahall by Husain Qulí Khán Jahán, when Bengal was again annexed to Dihlí, and the Afgháns withdrew to Orísá. Then the Bengal Military Revolt broke out, and Orísá was invaded, in A. H. 1000, (A. D. 1592) by Mán Singh, when the country was finally annexed to the Dihlí empire. Hence Medinípúr and Hijlí appear

* The name occurs in the *Kín* as a Mahall; but as name for a large division it does not seem to have been used before the 18th century.

† The *Kín* also mentions a mahall Bhowálbhúm under Sirkár Madáran; modern maps do not give this name.

‡ So according to the Akbarnámah. Stirling fixes an earlier date; but Sulaimán reigned from A. H. 975 to 980. Besides, Akbar sent in 972-973 ambassadors to Mukund Deb.

together in Todar Mall's rent-roll as one of the 5 Sirkárs of the province of Orísá. Subsequently, Orísá had separate governors; but under Prince Shujá' their power was lessened, and the portion from Mandalghát to Baleswar (Balasore) was separated from Orísá and permanently attached to Bengal.*

Hijli (*Hidjelee*, *Hedjelee*, Grant; *Hingeli*, Van den Broucke; *Ingellee*, Rennell; *Injelee*, Stewart, Marshman; *Angeli*, Purchas, De Laët, &c.) appears in the *Ain* under the name of Máljhattá. According to the legends preserved in the District, the Muhammadans first attempted a settlement during the reign of Husain Sháh of Bengal, about A. D. 1506, when one Táj Khán Masnad i 'Alí and his brother Sikandar Pahlawán established themselves at the mouth of the Rasúlpúr River,† opposite Ságár Island. They conquered the whole of Hijli, which is said to have remained in the family for nearly eighty years, when it passed into the possession of a Hindú. As late as 1630 we hear of the conquest of Hijli. "Hingeli, which had for many years a chief of its own, was conquered about 1630 by the Great Mogul; but in 1660, the lawful chief of Hingeli, who from a child had been kept a prisoner, found means to escape, and with the help of his own to re-conquer his country. But he did not long enjoy it: he was in 1661 brought into Aurangzeb's power with the help of the E. I. Company [the Dutch Company], and was again imprisoned and better looked after than at first."‡

The Southern Frontier.

The southern frontier of Muhammadan Bengal was the northern outskirts of the Sundarban, which extended, generally speaking, in the same manner almost as it now does, from Hatiágarh, south of Diamond Harbour on the Húgli,

* "Sjah Sousa had already during his time divided Hingeli from Orisa, and had put there a separate governor, and it is for this reason alone that Hingeli, which by position belongs to Orisa, has been attached to Bengal. So it is also with the governors of Ballasour and Pipoli [Pip lí or Sháh b a n d a r, now deserted, on the Subarnarekhá River], which the Great Mogul ordered once to be under the governor of Orisa and then again under the governor of Bengal, because the two places are close to the sea." F. Valentyn, Vol. V.

Van den Broucke's map of Bengal in 1660, given by Valentyn, still shows north-west of the town of Medinipúr the "Gedenkteeken," or memorial stone, (corresponding to the 'Old Tower' of modern maps) that marked the frontier between Bengal and Orísá. Grant says that the coast of Hijli and Medinipúr as far as Balasore (Baleswar) was attached to Bengal on account of the Mags and the Portuguese privateers, who were to some extent controlled by the Imperial fleet stationed at Dháká.

† Few rivers in India have Muhammadan names. Due south of Contai the maps give a village of the name of Masnad 'Alipúr. Táj Khán's tomb is on the Rasúlpúr River.

‡ From Valentyn's work, Vol. V. The 'Alamgirnámah says nothing about it.

to Bâgherhât in southern Jessore and to the Haring'hâtâ (Horingotta), or 'Deer-shore River;' i. e. along the southern mahalls of Sirkârs Sâtgaon and Khalifatâbâd. Beyond the Haring'hâtâ and its northern portion, called the Madhûmatî or 'honey-flowing,' the frontier comprised Sirkârs Baklâ and Fathâbâd, the modern districts of Farîdpûr and Baqirgaúj (north). Sirkâr Fathâbâd included the islands of Dak'hin Shahbâzpûr and Sondîp, at the mouth of the Megna. Tiparah, Bhaluah, Noak'hâlî, and District Châtgaon, were contested ground, of which the Râjâhs of Tiparah and Arakan were, at least before the 17th century, oftener masters than the Muhamínadans. It was only after the transfer of the capital from Râjmahall to Dhákâ, that the south-east frontier of Bengal was extended to the Phañî River, which was the imperial frontier till the beginning of Aurangzib's reign, when Châtgaon was permanently conquered, assessed, and annexed to 'Çûbah Bangálâh.'

Various etymologies have been proposed in explanation of the word 'Sundarban.' It has been derived from *sundar* and *ban*, 'the beautiful forest;' or from *sundarî*, a small timber tree (*Heretiera litoralis*), which is exported as fuel in vast quantities from the coast and is supposed to have been so called from its red wood. Others again have derived the word from Chandradîp-ban, or Chandradîp forest, from the large zamîndârî of Chandradîp, which occupies the south and south-east of Bâqirgaúj District. Or, the name has been connected with the Chandabhandas,* an old Sundarban tribe. Grant derives it from Chandraband, 'the embankment of the moon,' which seems to have been the etymology that obtained at his time, and which has led to the spelling 'Soonderbund' adopted by Europeans.

The application of the name to the whole seacoast of southern Bengal is modern. Muhammadan historians call the coast strip from the Húglî to the Megna 'Bhâtî,' or 'low land subject to the influx of the tide,' and even now-a-days this name is very generally used. The sovereignty of this district, according to the Akbarnámah and the Râjah Pratâpaditya legend, was divided among twelve chiefs; and Col. Wilford, whatever may have been the source of his information, says that "the kings of Arakan and Comillâ were constantly striving for the mastery, and assumed the title of lords of the twelve Bhûniyâs."†

The sea coast itself is marked on Van den Broucke's map in Valentyn's work as 'onbekent,' or 'unknown,' consisting of numerous islands and

* A copper plate grant in the possession of the Society, found at 'Âdilpûr (Edilpore), mentions that the villages of Bagulî, Bittogádâ, and Udayamuna, were given, in the third year of the reign of Keshab Sen, i. e. in 1136 A. D., to one Jovaradeb Sarma. The grant mentions the tribe of the Chandabhandas. The reading Chandabhandas, as Bábu Pratâpachandra Ghosh informs me, is an improved reading for Chhattabhatta, as the name was read by Gobind Ram; vide *Journal*, 1886, Vol. VII, p. 40.

† *As. Researches*, XIV, p. 451.

rivers, 'peryculeous' for ships, being the place where the "Jagt ter Shelling"* founded in 1661.

In order to trace the direction of the northern outskirt of the Sundarban, as it existed some time before 1582 A. D., we have again recourse to Todar Mall's rent-roll in the *Áin*. There we find that Mahall *Hatíágarh* (below Diamond Harbour) was, in 1582, the most southerly assessed mahall of *Sirkár Sâtgaon*. The jungle boundary then passed north-east to *Baridhattí* and *Medinímall*, north-west of Port Canning, to *Bálinḍá* and *Máhihattí* (*Myehattee*), then south again to *Dhuliápur*,† and *Bhaluká* to the *Kabadak* River. These mahalls belong to what is now called the 24-Parganahs; and Sheet 121 of the Indian Atlas of the Survey Department will shew that they lie even now-a-days very little north of the present northern limit of the Sunderban in the 24-Parganahs. Going up the *Kabadak*, in *Jessore*, we come to *Ámadí*,‡ to the north of which, in the immediate neighbourhood, we have *Masidkoor*, a corruption of *Masjidkur*, one of the clearances of *Khán Jahán* (died A. D. 1459),§ the warrior saint of *Khalífatábád* or Southern *Jessore*, to whom the traditions of the present day point as an indefatigable establisher of *Sundarban-ábádís* (clearances.) The *Áin* then gives Mahall *Tálá*, with *Tálá* on the left bank of the *Kabadak* as chief town and *Kopilnuni*|| near it, and then mahalls *Sáhas*, *Khálicpúr*, *Charúliá*, *Rangdiyá* (wrongly called in the Indian Atlas *Sangdiá*) and *Sálmábád*,¶ north of the modern *Morrellganj* at the beginning of the *Haring'hátá*. North-west of *Morrellganj*, on the *Bhairab* (the 'dreadful'), we have the small station of *Bagherhát*, which gives name to a Sub-Division, and in its immediate neighbourhood we come to another clearance by the patron-saint of *Jessore*, where his mosque and tomb stand. It is the country round about *Bágherhát* which up to the end of last century bore the name given it in the *Áin*, '*Hawelí Khalífatábád*,' the '*Vicegerent's* clearance.' Here, amidst the creeks and the jungles, which no horseman can approach, *Nuḡrat Shah*, as will be seen below, erected a mint, apparently in opposition to his father '*Alauddín Husain Sháh*.'**

* *Vide* Mr. Foster's article, *Journal, As. Socy. Bengal*, 1872, Part I, p. 36.

† North of *Ishwaripúr* (*Issuripore*), the residence of *Pratápaditya*.

‡ Marked wrongly on the Survey map *Armadi*. *Rennell* has correctly *Amadi*.

§ *Westland, Jessore Report*, p. 20; *Gaur Dás Baisákh, Journal, As. Soc. Bengal*, 1867, pp. 130, 131; also, *Journal*, 1872, Part I, p. 108.

|| *Rash Bihári Bose, J. A. S. Bengal*, 1870, Part I, p. 235; *Westland, Jessore Report*, Chapt VI, and p. 266.

¶ Here also the *Áin* has the form *Sulaimánábád*.

** It is curious that a little higher up on the *Bhairab*, east of *Khulná*, where the *Atáharabanka* (the 'eighteen windings') joins the *Bhairab*, there is an '*Aláipúr*, & c. '*Aláuddín's* town. Were it not for the distinct statement of the *Biḡdrussaldán* that '*Aláuddín*, after arriving as an adventurer in Bengal, settled at a *Chandpúr* (a very

Thus we see that in southern Jessore also the northern limit of the Sundarban has not considerably changed since 1450 A. D.

Passing from the Haring'hātā eastward, we come to Sirkār Baklá and Fathábád. Sirkār Baklá only contained four mahalls, *viz.* Ismá'íl-púr or Baklá; Srírámpúr; Sháhbádpúr; and 'Adilpúr, (from 'ādīl' just, corrupted on the maps to Edilpore), which all belong to Bāqirganj District. Abulfazl, in speaking of the great cyclone that swept in 1583 over Baklá, says that the then zamindār of Baklá had a son of the name of Pramānand Rái. Sirkār Fathábád derives its name from the Hawelí mahall Fathábád, in which the modern station of Faridpúr lies. Yúsufpúr and Belphúlt, in Jessore District; Hawelí Fathábád and Sirdiá (Sherdia), in Faridpúr; Balaur, Telhattí, Sarail or Jalálpúr,* Khargapúr, in both Faridpúr and Dháká; Hazratpúr, in Dháká; Rasúlpúr, in Dháká and Bāqirganj; the Islands of Sondíp and Sháhbádpúr; and a few other mahalls which I have not yet identified, belong to this Sirkār. Thus we see that the greater portion of both Sirkárs lies between the Haring'hātā (Madhumatí) and the Títulíá River, which flows between Bāqirganj District and the island of Dak'hin Sháhbádpúr. At the mouth of the Títulíá we find the Don Manik Islands, one of the few still surviving geographical names of the Portuguese.† Opposite to these islands we have mahall Názirpúr, which we find on the maps of De Barros and Blæv, placed rather far to the north. Near it, we also have 'Fatiabas',‡ the chief town of Sirkār Fathábád. The whole south and south-east of Bāqirganj District is occupied by the old Chandradíp zamindárá, which according to some, as we saw above, gives name to the Sundarban. On Rennell's map it is marked 'depopulated by the Muga.'

Abulfazl says that there were in Sirkār Fathábád three classes of zamindárs, which perhaps refers to the independent Afghán, Hindú, and Portuguese chiefs. When Akbar's army, in 1574, under Mun'im Khán-Khánán invaded Bengal and Orísá, Murád Khán, one of the officers, was despatched to South-Eastern Bengal. He conquered, says the

common name) in Rágha District, *i. e.* west of the Húglí, I would be inclined to identify the Chandpúr near this 'Aláipúr as the place where the Husain dynasty of Bengal kings had its home, especially because Husain first obtained power in the adjacent district of Faridpúr (Fathábád), where his earliest coins are struck.

The Indian atlas (sheet No. 121) spells 'Aláipúr 'Alypore,' which blots out every historical recollection, and places it moreover wrongly on the right bank, instead of on the left, of the Athárabanká. 'Aláipúr is a flourishing place and has numerous potteries.

* Which, like the name of the Sirkār, reminds us of *Jaláluddín Fath Sháh.*

† Their names for Húglí (Porte Piqueno) and for Chátágon (Porto Grande) are no longer known; but Sherpúr Firingí, Firingibásár, Point Palmyras, still remind us of their former importance in this part of India.

‡ Van den Broucke's map has wrongly Fathpúr.

Akbarnámah, Sirkárs Baklá and Fathábád, and settled there; but after some time, he came into collision with Mukund, the powerful Hindú zamindár of Fathábád and Bosnah, who, in order to get rid of him, invited him to a feast and murdered him together with his sons.* This notice helps us to explain a remark made by Grant that in Sháh Shujá's rent-roll (1658) a portion of Sundarban land had for the first time been assessed at Rs. 8,454, the ábádís being called Murádkhánah.† The name of Mukund still lives in the name of the large island 'Char Mukundia' in the Ganges opposite Faridpúr. This Mukund is the same zamindár whom the Pádisháhnámah wrongly calls 'Mukindra of Bosnah.' His son Satrjít gave Jahángír's governors of Bengal no end of trouble, and refused to send in the customary *peakkash* or do homage at the court of Dháká. He was in secret understanding with the Rájahs of Koch Bihár and Koch Hájo, and was at last, in the reign of Sháhjahán, captured and executed at Dháká (about 1636, A. D.) One of his descendants, or successors in the zamindari, is the notorious Sítarám Rái of Mahmúdpúr.‡

Another Zamindár of Fathábád is mentioned in the beginning of Sháhjahán's reign, Majlis Báyzid,—by his very name an Afghán.

The Parganahs to the south of Báqirganj are called on the maps 'Boozoorgoomedpore' and 'Arungpore,' which names are connected with Buzurg Umed Khán, son of Sháístah Khán (Aurangzib's governor of Bengal from 1664 to 1677) and with Aurangzib, 'Arang' being a corruption of Aurang. East of these two Parganahs we have Sháístah-nagar.§ These names, though they do not perhaps shew when the mahalls were reclaimed, point to the time when they came for the first time on the Imperial rent-roll.

Sirkár Fathábád, as stated above, comprised the islands of Dak'hin-Shahbázpúr, S o n d í p, &c. Of the latter island we have a short notice by Cæsar Fredrick, the Venetian merchant, who travelled in Asia, as he himself says, from 1563 to 1581. He left Pegú for Chatigan (Chátgáon), "between

* Áin translation, p. 374.

† Grant derives the name from *murád* and *khánah*, the 'house of desire,' but there is little doubt that we should derive it from Murád Khán, 'Murád Khán's clearance.' I do not know to what part of Báqirganj or Faridpúr the name was applied. Grant also says that Murád Khánah was sometimes called Jerádkhanah.

‡ Journal, As. Socy. Bengal, for 1872, Part I, pp. 58, 59. Satrjít's name occurs in the name of the town of Satrjítpúr on the Noboganga, in north-eastern Jessore, not far from Mahmúdpúr (wrongly called Mahomedpore on all modern maps) on the Madhúmatí and from the old town of Bosnah, on the Alangk'hálí [Ellenkálí] Branch. Vide Westland's Jessore Report, p. 32.

§ Sháístah Khán's real name is Mírás Abú Tálib; hence we find in Dháká District a Tálibábád. Núr Jahán was Sháístah Khán's aunt; vide Áin translation, p. 512.

which two places there was much commerce in silver,"* but "encountered a 'Touffon' (*túfán*, cyclone), which take place in the East Indies every ten or twelve years; they are such tempests and stormes, that it is a thing incredible but to those that have seen it," and was driven to Sondíp. "And when the people of the Island saw the ship, and that we were comming a-land: presently they made a place of *bazar*, or a market, with shops right over against the ship, with all manner of provision to eate, which they brought down in great abundance, and sold it so good cheape, that we were amazed at the cheapness thereof. I bought many salted kine thore for the provision of the ship for half a *Larine* apiece, which *Larine*† may be 12 shillings 6 pence, being very good and fat; and 4 wilde hogges ready dressed for a *Larina*; great fat hennes for a *Bizzo* [pice] a piece, which is at the most a penny: and the people told us that we were deceived the half of our money, because we bought things so deare. Also a sack of rice for a thing of nothing; and consequently all other things for humane sustenance were there in such abundance, that it is a thing incredible but to them that have seen it. This Island is called *Sondiva*, belonging to the kingdome of Bengala, distant 120 miles from Chatigan, to which place we were bound. The people are Moores, and the king a very good man of a Moore king, for if he had been a tyrant as others be, he might have robbed us of all."

Ralph Fitch also was about the same time in south-eastern Bengal. He says, "From Chatigan in Bengala I came to *Bacola* [*Sirkár Baklá*]; the king whereof is a Gentile [*Hindú*], a man very well disposed and delighted much to shoot in a gun. His country is very great and fruitful, and hath store of rice, much cotton cloth, and cloth of silke. The houses be very faire and high builded, the streetes large, the people naked except a little cloth about their waste. The women wear great store of silver hoopes about their neckes and armes, and their legs are ringed with silver and copper, and rings made of elephants teeth.

"From *Bacola* I went to *Serrepore*,‡ which standeth upon the river Ganges, the king is called Choudery. They be all here abouts rebels against their king Zebaldim Echebar:§ for here are so many rivers and islands,

* The export of silver from Pegú to Bengal may have supplied the Bengal mints with silver. Sir A. Phayre and Dr. T. Oldham speak of the export of gold from Burma to the Coromandel coast. Considerable quantities of silver may also have come from Asam, where silverpieces even for small fractions of a rupee were current.

† *Lári* (لاری). *Ain* translation, pp. 28, 27. It is so called from *Láristán* in Persia.

‡ *Sherpúr Firingí*, marked by Van den Broucke a little south of *Idrákpúr*, on the *Dalásari*, in *Parganah Bikrampúr*, where *Rájá Ballál Sen's* residence was. It is not given on modern maps.

§ The first *b* is a constant misprint for *l*: *Jaláuddín Akbar*.

that they flee from one to another, whereby his horsemen cannot prevail against them. Great store of cotton cloth is made here.

"Sinnergan [Sunnárgaon] is a towne six leagues from Serrepore, where there is the best and finest cloth made of cotton that is in all India. The chief king of all these countries is called Isacan,* and he is chiefe of all the other kings, and is a great friend to all Christians. *** I went from Serrepore the 28th November 1582 for Pegu."

Sondíp was only conquered in the end of 1666 (middle of Jumáda II., 1076), when Diláwar Khán Zamíndár submitted, though not without fighting, to Aurangzib's army that invaded Chátgáon.

I have a few words to say on the hypothesis which has often been started, that the whole of the Sundarban was once in a flourishing condition. No convincing proof has hitherto been adduced; and I believe, on physical grounds, that the supposition is impossible. The sporadic remains of tanks, gháts, and short roads, point to mere attempts at colonization. The old Portuguese and Dutch maps have also been frequently mentioned as affording testimony that the Sundarban, even up to the 16th century, was well cultivated; and the difficulty of identifying the mysterious names of the five Sundarban towns Pacaculi, Cuipitavaz, Noldy, Dipuria (or Dapara), and Tiparia, which are placed on the maps of De Barros, Blaeu, and Van den Broucke close to the coast-line, has inclined people to believe that they represent "lost towns." Now the first of these five towns, from its position, belongs to the Sundarban of the 24-Parganahs, and the second (Cuipitavaz) to that of Jessore District, whilst the remaining three lie east of it. But Pacaculi is either, as Col. Gastrell once suggested to me, a mistake for Pacacuti, *i. e.* *pakká kof'hí*,† a factory or warehouse, erected by some trading company, as we find several along the Húgli; or it stands for Penchakuli, the name of the tract opposite the present mouth of the Damúdar, or a little above the northern limit of the Sundarban. Cuipitavaz I have no hesitation to identify with Khalífatábád.§ Van den Broucke also places it correctly south-east of Jessore. Noldy is the town and mahall of Noldí (Naldí) on the Noboganga, east of Jessore, near the Madhúmatí. Dipuria is Dapara, or Daspara, south-east of Báqirganj station, near the right bank of the Tituliá, still prominently marked on Rennell's map; and Tiparia cannot stand for anything else but the district of Tiparah, which is correctly placed north-east of Daspara.

* 'Isá Khán. Abul Fazl calls him 'king of Bháti,' and says that twelve zamíndárs were under him. He was powerful enough to make war with Koch Bihár. *Vide* *Áin translation*, p. 342, note.

† Westland, Jessore Report, p. 231.

‡ Houses are either *karchá* [mud-houses], or *pakká*, brick or stone-built.

§ The letter *f* often turns in Bangálí to *p*; hence Khalífatábád becomes Kolkpít-ábád. Thus Firáspúr becomes Perojepore.

The old Portuguese and Dutch maps, therefore, prove nothing. They support the conclusion which I drew from Todar Mall's rent-roll, that in the 24-Parganahs and Jessore the northern limit of the Sundarban, omitting recent clearances, was in the fifteenth century much the same as it is now. But considerable progress must have been made in Báqirganj District, as we see from the numerous accessions, during that period, to the Imperial rent-roll.

Of other names given on old maps along the southern boundary of Bengal, we have (above Noldy) Nao Muluco (?), Buram (Borhun, in the 24-Parganahs); Maluco (Bhaluká, on the Kabadak, ?); west of them, Agrapara and Kore, (Agrapará and Dak'hineshor, north of Calcutta); and on the other side of the Húglí, Abegaca, which seems to be some Amgáchha, unless it is slightly misplaced and refers to Ambiká (Kalnah); Bernagar, which should be Barnagar, on the other side of the river below Kore; Betor (?) as on Blaev's map, and Belor, (?) on that of De Barros. Van den Broucke's map gives, in Húglí District, Sjanabath (Jahánábád); Sjandercona (Chandrakoná); Cannacoel (Kánákul); Deniachali (Dhonek'háli); Caatgam (Sátgáon); Tripeni (Tripani, the Muhammadan form of Tribení); Pandua (Paqduah); Sjanegger; Basanderi (the old mahall Basandhari), where Van den Broucke makes the remark, '*t Bosh Sanderie alwaar Alexandre M. gestuyt werd*, 'the bush Sanderie where Alexander the Great was stopped.'

Again, along the lower Ganges the old maps have Bicaram (Bikram-púr, south of Dháká); Belhaldy; Angara (Angaria, at the confluence of the Kirtináśá and the Megna); Sornagam (Sunnárgáon); Dacca; Mularangue;* Bunder (Bandar, 'harbour'); Nazirpur, mentioned above; Bulnei or Bulnee, ?; Guacala or Gucala, perhaps a mistake for Bacala; Noorkuly or Noricoel, as Van den Broucke gives it, (Noríkol, due south of Dháká, and a little south of the right bank of the Kirtináśá); Sundíva (Sondip Island); Jugadia (Jogdiah in Noák'háli near the Little Phani, mentioned in the *'Alamgír-námah* as an Imperial thánah, and often quoted as the seat of English and French factories in the eighteenth century); Traquetea, ?; Maua, or Moua, and Alvia, for which Van den Broucke gives Maya and Alvia, ?; Jeffieri, on Van den Broucke's map, the same as Rennell's Jeffri, at the mouth of the Phani, right bank.

The coast of Arakan on the maps of De Barros and Blaev is broken up into numerous islands as the Sundarban coast: it looks as if some of them belonged to Bengal. Thus we find Bulua and Bacala, which must refer to Bhaluah in south Tiparah and Baklá. Chokuria may be identified with Chukuria, marked on modern maps opposite Maskal Island, on the Mamori

* As this place is marked on an island south-west of Dháká, it seems to be Mál-nadángi in the south of Char Mukundíá.

River, as thánah and saltgolah; but the names Irabu, Maoa (perhaps a mere repetition of the Maua given above), Santatoly, Orieton, are unknown to me.

Blaev's map (Pl. IV) and the Chart of the empire of the Grand Mogul by N. Sausson (A. D. 1652) give opposite Chatigam (Chittagong) a town, called Bengala or Bengola. Purchas (a compiler who never came to India) says in his 'Pilgrims,' "Gouro, the seat Royall, and Bengala are faire Cities. Of this, the Gulfe, sometimes called *Gangeticus*, now beareth name *Golfo di Bengala*." Rennell, in his 'Memoir,' mentions the town as being given "in some ancient maps and books of travels; but no traces of such a place exist." But he says that it is placed near the eastern branch of the Ganges, and that it may have been carried away by the river (Ganges?). Lately also, a writer in Mookerjee's Journal (Dec. 1872), Mr. H. J. Rainey, published an imaginative account of the submersion of this now lost city, which in his opinion had given name to the kingdom of Bengal. But the town is nowhere mentioned by Muhammadan historians, nor by Ibn Batútah, Cæsar Frederick, and Ralph Fitch who were in Chatgaon, nor by De Barros and Van den Broucke. The probability, therefore, is that no such town ever existed, and that the name was put on Blaev's map from Purchas's statement; or else the name 'Bengola' is a mere corruption of what we call a 'Bungalow' (بنگلا, *bangalah*), or a 'Flagstaff Bungalow,' of which we find several marked on District maps of Chittagong along the Karanphúl River, as early as on Rennell's chart. However, this mysterious town is not to be identified with the place 'Dianga' given by Van den Broucke half way between Chittagong and Rammoe (Rámú, or Rámú*), because Dianga is the Dak'hindángá or the Brahmandángá, both on the Sangú River, south of Chátgáon, where saltgolahs still exist.†

Regarding the State of Codavasean, which the old maps place east and north-east of Chátgáon, *vide* Wilford's Essay, *As. Researches*, Vol. XIV, p. 450.

The province of Chátgáon was no secure possession, and seems to have been alternately in the hands of the kings of Bengal, the Rájahs of Tiparah, and the kings of Arakan. In 750 A. H. (A. D. 1350), about which year Ibn Batútah was in Chátgáon,‡ it belonged to king Fakhruddín of Sunnárgháon. That year falls within the reign of the Arakanese king Meng-di, who is said to have reigned from A. D. 1279 to 1385, or 106 years,§ when the king of Thu-ra-tan (Bengal), called Nga-pu-kheng, courted

* The most south-easterly point to which the Mughuls advanced.

† The word 'dángá,' which occurs so often in geographical names in Bengal, signifies 'highland'.

‡ Called in Lee's translation ممدكوان. Regarding Fakhruddín *vide* below.

§ *Vide* Sir A. P. Phayro's History of Arakan, Journal, A. S. Bengal, for 1844, p. 45. Thu-ra-tan Sir Arthur Phayre identifies with Sunnárgháon.

his alliance. About 1407, again, the king Meng-tsau-mwun fled to Bengal, and witnessed the war between Rájah Káns and Jaunpúr. He was ultimately restored to his throne with the help of Bengal troops; but he became "tributary to the king of Thu-ra-tan, and from this time the coins of the Arakan kings bore on the reverse their names and titles in the Persian character. This custom was probably first made obligatory upon them as vassals; but they afterwards continued it *when they had recovered their independence, and ruled the country as far as the Brahmaputra River.* Meng-tsau-mwun, *having got rid of his allies,* meditated a change of capital."

In 1512, Chátgáon was conquered, according to the Ráj Malá,* by the Rájah of Tiparah, who drove away Husain Sháh's garrison. Whether the Rájah of Tiparah kept it for any time is doubtful; for in 1517, "John de Sylvera was invited by the king of Arakan, and he appears to have gone to Chatigam, then a port of that king's dominions.†" Anyhow, we can now understand why Nuqrat Shah, Husain Sháh's son, should have invaded Chátgáon;‡ but although popular belief ascribes to his invasion the first Muhammadan settlements in the District, it is clear from the preceding that his invasion cannot have been the first.

It is not known how the District was again lost; but during the troubles of Sher Sháh's revolution, the Mughul invasion, the aggressions of the Portuguese, and the Bengal Military Revolt, Chátgáon did not belong to Bengal. If, therefore, Todar Mall in 1582 included it in his rent-roll, he did so on the principle on which he included Kalinga Dandpát and Sirkár Rájah-mandri in the rent-roll of Orísá §

The Eastern Frontier.

The eastern frontier of Muhammadan Bengal extended from Sunnár-gáon and the Megna (but in Sháhjahan's reign, from the Phaní River over southern and western Tiparah) northward, and then passed to the east including the District of Silhat. The boundary passed along the southern slopes of the Jaintiah, Khasiah, and Gáro Hills to Mahall Sherpúr in northern

* Journal, A. S. Bengal, Vol. XIX, for 1850, pp. 545, 546.

† Vide Sir A. Phayre's History of Pegu, J. A. S. B., 1873, pt. I, 127.

‡ For particulars vide my extract from the *Tárikh-i-Hamidi* in Journal, 1872, Part I, p. 336.

§ "From Satagam [Sátgáon-Húglí] I travelled by the country of the king of Tipara, with whom the Mogen [Mags] have almost continual warres. The Mogen which be of the kingdom of Recon [Rakhaing, Arakan] and Bame [Rámú], be stronger than the king of Tipara, so that Chatigan, or Porto Grando, is often times under the king of Recon." — *Ralph Fitch.*

Muhammadan historians spell the word 'Rakhaing' رخنگ, *Rakhang*, or give the still shorter form رخ, *Rukh*, whence De Laët's "Booh, on the borders of Bengal."

Maimansingh to the right bank of the Brahmaputra near Chilmári, and from here along the river to Mahall Bhitband, which formed the north-east frontier. The sirkárs that lay along the boundary were Sunnár-gaon, Bázúhá, Silhat, and G'horág'hát; and the neighbouring countries to the east were Tiparah, Kachhár (the old Hirumba), the territories of the independent Rájahs of the Jaintiah, Khasiah, and Gáro Hills, and, on the left bank of the Brahmaputra, the Karibári Hills, the zamíndárs of which were the Rájahs of Sosang. They depended in reality on the powerful kingdom of Koch Hájo,* the '*Azo*' or '*Asoc*' of old maps, which extended along the left bank of the Brahmaputra to Kámrúp. In the Karibári Hills, the Muhammadans possessed, opposite to Chilmári, the old frontier thánah Hatsilah, which Rennell still marks as 'Hautchella.' The north-eastern frontier was never absolutely fixed. Barítalah, on Van den Broucke's map *Bareithella*, was looked upon as a frontier town till the beginning of Aurang-zib's reign.

The invasions on the part of the Asamese were as numerous as the inroads of the Muhammadans into Ásám, which had commenced under the successors of Bakhtýar Khiljí. During the reigns of Rájah Káns and his son, the Asamese under Chudangpha (A. D. 1414 to 1425) conquered north-eastern Bengal as far as the Karataya;† and as about the same time Jaunpúr was at the height of its power, successfully encroaching on the western frontier, and the Rájahs of Tiparah made likewise invasions,‡ we may assume that Bengal under the kings of the Káns dynasty was most circumscribed. With the restoration of the Ilyás Sháhí dynasty (about A. D. 1440) and the gradual downfall of Jaunpúr, Bengal recovered her ancient limits, and entered upon her most flourishing period. The invasion of Husain Sháh into Kámrúp is well known;§ but Kámrúp was only permanently annexed in 1637, when Gauhatti became the north-eastern frontier of Bengal.

Silhat, as we shall see below, was conquered in A. D. 1384, and the earliest inscription hitherto found there, belongs to the reign of Yúsuf Sháh (A. D. 1480). North-western Silhat had the name of Láúq, or Láúr, and the thánah which the Muhammadans established there, was under the commander of the 'Iqlím Mu'azzamábád,' 'the territory of Mu'azzamábád,' also called 'Mahmúdábád.' The exact extent of Mu'azzamábád is still unknown; but the name occurs on coins and on Sunnár-gaon inscriptions, once in conjunction with Láúr, and once with Tiparah, and it seems, therefore, as if the "iqlím" extended from the Megna to north-eastern Maimansingh and

* *Vide* Journal, A. S. Bengal, Part I, 1872, p. 53.

† So according to the Ásám Búranjí; *vide* Useful Tables, p. 273.

‡ Rájmalá, J. A. S. B., XIX, 1860, p. 542.

§ J. A. S. B., 1872, Part I, pp. 79, 335.

the right bank of the Surmá. In the *Áin*, we find, indeed, under Sirkár Sunnárgháon, a Mahall Mu'azzampúr, the chief town of which lies between the Brahmaputra and the Lak'hia and bears the same name. The present inhabitants, as Dr. Wise tells me, know nothing of its ancient renown; and the only old building is a ruinous dargáh, called after a saint Sháh Langar, the impression of whose foot draws crowds of pilgrims about the time of the I'd ulfiṣṭ festival. The saint is said to have come from Egypt.

The thánah Láur is also mentioned in the *Áin* as a Mahall of Sirkár Silhaṭ, which consisted of Partábgarh; Pauchkhand; Banyáuchang; Bajúá Bayájú (?); Jaintia; Haveli Silhaṭ; Satrk'handal; Láúḍ;* and Harinagar. The author of the *Haft Iqlím* calls Silhaṭ repeatedly سريهاٹ *Srihaṭ*, and this form explains perhaps the 'Reino Sirote,' which De Barros and Blæv give instead of 'Silhaṭ' (*vide* Pl. IV). The town of Sirote is correctly placed on the right bank of the Surmá, which leaves no doubt as to the identity of both names.

Kámrúp, which also appears under the names of Kámrúd, Kámrú, and Káwrú, is often mentioned together with Kámatá.† The Brahmaputra which Ibn Baṭúṭah calls the 'Blue River,' is correctly described by the old traveller as coming from the mountains of Kámrúp. De Barros, however, and Blæv give the river the name of Caor, and show it as flowing from the Reino de Caor, north of Comota and Sirote. Wilford identifies Caor with "Gcḍa or Gaur, *i. e.* Gorgáon," meaning G'hargáon, the capital of A'ám. But G'hargáon (which is the correct spelling) was only built by Chu-klunpha, between A. D. 1549 and 1563, *i. e.* at a time when the materials had long been sent to Europe from which De Barros in Lisbon wrote his book. It seems, therefore, more natural to compare 'Caor' either with 'Gaur,' the old name of northern Silhaṭ, and which under the form of Gor is placed by Blæv north of Bengal, or with the name of the Gáros who inhabit the hills near the bend of the Brahmaputra.‡

The south-east frontier was Tiparah, or Tripura, spelt on old Muhammadan inscriptions *Tipúrah*, whence perhaps the form Tipora given by De Barros and Blæv. Abulfazl, in the *Áin i Akbari*, says—"Tiparah is independent; its king is Bijai Mánik. The kings all bear the name of Mánik,§

* So at least according to some MSS. *Vide* my text edition, p. 406, where سركهندل is a misprint for سركهندل. Láur lies at the foot of the hills.

† For Kámatá *vide* below. Husain Sháh is said to have invaded Kámrúp and Kámatá; and the *Áin* says, Kámrúp and Kámatá are in the possession of the Rájah Koch Bihár.

‡ Regarding Wilford's identification of Sirote, *vide* Asiatic Researches, XIV, pp. 337, 436. The places which Blæv gives between Gor and Caor, as Kandwana, Mewat, &c., are mentioned below.

§ According to the Rájmalá, the kings of Gaur had conferred this title on the Tiparah Rájahs. It is impossible to reconcile the discrepancy between the Rájmalá and the *Áin* as regards the time when Bijai Mánik reigned. According to the *Áin*

and the nobles that of Náráyan." The military power was estimated at 200,000 foot and 1,000 elephants; and numerous invasions of Silhat and Sunnargáon by the Rájahs of Tiparah are mentioned in the Rájmálá. The old capital was Udaipur, or Rángamáti, on the left bank of the Gúmti. Hence Van den Broucke speaks of 'Oedapoer and Tipera';* but on his map he places between Tipera and the Brahmaputra, above Bolua, the "Ryk van Udesse," which is not marked on the maps of De Barros and Blaeu. As he does not mention Udesse in his text, the name is either a mistake for Udaipur, or he has been misled by his countryman De Laët, who says, "Udessa, or Udeza, whose metropolis is Jokat or Jekanat, the furthest province of this empire to the eastward, is adjacent to the Mag kingdom, whose inhabitants are most ferocious barbarians," and who thus places Orísá (Odesá) and Jagarnáth near Arakan.

The western and southern portions of Tiparah are included in Todor Mall's rent-roll in Sirkár Sunnargáon; but they were only conquered, according to Grant, in Sháhjahán's reign; and in A. D. 1728, we hear of a re-conquest, when the district was placed on the rent-roll under the name of Raushanábád.

Before going further, I have a few words to say on the country of Jáj nagar, which Stewart, Stirling, Dowson, and Thomas agree in identifying with Tiparah. Stewart and Dowson, however, also apply the name to a portion of Orísá, and compare the word with the name of the town of Jájpúr, north-east of Katak, on the Baitarani. Jájpagar is mentioned as a country full of wild elephants (مرغز فيل) in the Tabaqát i Náqirí, and the two Tárikh i Fíruz Sháhís, *i. e.* up to about A. D. 1440, after which the name disappears. It also occurs in the Áin; but the passage refers to the reign of Hoshang of Málwah (A. D., 1405 to 1434).†

It is first mentioned as lying, together with Bang, Kámrúd, and Tirhut, near the kingdom of Lak'hnautí;‡ and when Tughán Khán ('Izzuddin Abul Fath Tughril) invaded Jájpagar, he left Lak'hnautí city in Shawwál, 641, and arrived after about a month, on the 6th Zí Qa'dah, at Katásan, the frontier of Jainagar.§ In the following year, 642 [A. D., 1244], the Rái of Jájpagar invades the kingdom of Lak'hnautí, and first seizes on Lak'hnor, which above was identified with Rápha (west of the Ilúglí), where he kills the jágírdár Fakhruddin Lágharí, and then marches on Lak'hnautí.

he would have reigned towards the end of the 16th century; but the Rájmálá places his reign much earlier. Journal, Vol. XIX, for 1850, p. 546.

* "The countries of Oedapoer and Tiparah are sometimes independent, sometimes under the great Mogul, and sometimes even under the king of Arakan."

† It may be that Dak'bin historians use the term to a later period.

‡ Tab. Náqirí, p. 163.

§ Loc. cit., p. 244. Katásan has not been identified. The MSS. have also Kátas, and Kátásin.

This remark would seem to shew that, in the opinion of the author of the *Ṭabaqát*, Jájñagar lay somewhere west or south-west of the Bardwán and Húglí Districts, *i. e.* in Jhárkhand, or Chutiá Nágpúr.

The next invasion, on a large scale, was undertaken by the Emperor Balban, who in his pursuit of Sultán Mughís, about A. D. 1280, marched from Lak'hnautí to Sunnárgáon, the independent Rái of which makes himself responsible not to let Mughís escape either by land or by water. From Sunnárgáon,* Balban arrives, after a march of 60 or 70 *kos*, at the confines of Jájñagar, where Mughís is surprised and killed.

From this remark by Baraní, Stewart, Stirling, Thomas, and Dowson† conclude that Jájñagar corresponds to Tiparah; and the eastern parts of Hill Tiparah certainly lie about 70 *kos* from Sunnárgáon. The Rájmalá, however, does not state that Tiparah had the name of Jájñagar.

Jájñagar is again mentioned during the reign of Ghiyásuddín Tughluq, when Ulugh Khán, in 1323 A. D., invades Talinga, Jájñagar, and Bedar;‡ and lastly, when Firúz Sháh, after his second unsuccessful invasion of Bengal to conquer Sikandar, returns, in 1360, from Hazrat Papduah to Zafarábád and Jaunpúr,§ where he stays during the rainy season. He then marches over Bihár to Jajnagar; arrives at Satgarh (?), the Rái of which retreats; then comes to Báránasí, the residence of a great Rái; crosses the Mahindrí, and goes for some distance into Talinga, to which country the Rái had fled. Firúz Sháh then retreats, passes through the country of Rái Parihán [Bir Bhán Deo, *Lucknow Edition*], and arrives in Padmáwatí and Baramtalá, great fields for elephants, and returns quickly to Karah.||

Lastly, in the *Áin* (my text edition, p. 472, l. 6), Hoshang of Málwah goes in disguise to Jájñagar, in order to obtain elephants.

In these passages it is clear that Jájñagar represents a country between Talinga and Bihár, or, as expressed in the *Ṭabaqát*, west of Rápha, *i. e.*, the

* Baraní, p. 87. The *Bibl. Indica* Edition has Hájñagar, Jájñagar, and (once) Jájñagar.

† *History of India*, Vol. III, pp. 112, 113. The *Bibl. Indica* Edition of Badáoní, I, p. 129, calls Mughís wrongly Mu'izz, and says that he had gone towards Jájñagar and Tárkílah (or Nárkílah, as the *Lucknow* edition of Badáoní has).

‡ Badáoní, I, 223. Dowson, III, 234. Baraní, 450.

§ Zafarábád, which is so often mentioned by Muhammadan historians, lies on the right bank of the Gúmí, a little below Jaunpúr, which lies on the left bank. The maps give, of course, Jaffurabad.

|| Badáoní, I, 247. Dowson, III, 312 to 316. Dowson has Banárasí, for Báránasí; and Firishtah (*Lucknow* edition, p. 147) has 'Banáras, which is the residence of the Rái of Jájñagar.'

Kaṭak is called in the *Áin* 'Kaṭak Banáras;' and from the account translated by Dowson from 'Aṣif it is clear that south-western Orísá is meant, although the comparison of Jájñagar and Jájpur may be redundant. Rennell in his *Bengal Atlas* (Map VII) gives a Baramtalá in Singhbhúm, near northern Mayurbhanj.

wild districts of western Orísá, Chutiá Nágpúr, and the eastern portions of the Central Provinces, of which Ratanpúr, Bastar, and Sirguja are also mentioned in the *Áip* as hunting places for wild elephants. But it is remarkable that Baraní, in relating Balban's expedition, places Jájnapar 70 *kos* beyond Sunnárgháon, whilst in his account of Tughluq Sháh's reign he gives the same name to a district near Talinga; and we are forced either to believe that there were two Jájnapars, one famous for elephants near south-western Bengal (Ṭabaqát i Náçirí, Baraní, Firúzsháhi, *Áip*), and another in Tiparah or south-eastern Bengal (on the testimony of a single passage in Baraní); or to assume that there was in reality only one Jájnapar, bordering on south-western Bengal, and that Baraní in the above single passage wrote Sunnárgháon by mistake for Sátgháon,* which would remove all difficulties.

The Northern Frontier.

From Bhítarband, near the bend of the Brahmaputra, and in later times from Gauhattí in Kámrup over K'hontag'hát, the frontier passed along the southern portions of Koch Bihár to Mahall Pátgháon, or Pátgrám (west of Koch Bihár), which is mentioned by Mughul historians as the frontier-town in the extreme north, and from there along the foot of the hills and forests of Sikkim and Nepál to the northern portions of Púrniah District. Thus by far the greater portion of what is now-a-days called the Koch Bihár Division, did not belong to Bengal.

The Sirkúrs along the northern frontier were G'horág'hát, Panjrah, Tájpúr, and Púrniah.

The inhabitants of northern Bengal according to the Ṭabaqát i Náçirí were the Koch, Mæch, and Thárú tribes, whose Mongolian features struck the first invaders as peculiar.†

The Rájahs of Northern Bengal were powerful enough to preserve a semi-independence in spite of the numerous invasions from the time of Bakhtiyár Khiljí, when Debkot, near Dinájpúr, was looked upon as the most important military station towards the north.

During the fifteenth century, the tract north of Rangpúr was in the hands of the Rájahs of K á m a t á (কামত্যা), to which country passing allusion was made above. The kingdom is prominently marked as 'Reino de Comotah,' or Comotay, on the maps of De Barros and Blaeu (Pl. IV). The town of

* Baraní's statement of the distance of 70 *kos* would admirably suit Sátgháon; it would bring us to Mayurbhanj and western Chutiá Nágpúr.

† For 'Thárú' Stewart has *Neharu*, but there can be no doubt that the author of the Ṭabaqát means the Thárús of Mithila. Vide Dalton, *Ethnology of Bengal*, p. 126; J. A. S. B., 1872, Part I, p. 66.

The *Pádisháhnámah* says of the Asamese also that they resemble in features the Qarálpaqs of southern Siberia.

Kámatá, or Kámatápúr, lay on the eastern bank of the Darlá river, which flows south-west of the town of Koch Bihár, and joins the Brahmaputra near Bagwah. The river near its confluence with the Brahmaputra, separates mahall Bhítarband from Báhirband. The town itself and the Darlá river are correctly marked on the old maps. Buchanan estimated the circumference of Kámatápúr at nineteen miles; the palace, as in the case of Burmese and Chinese towns, stands in the centre. History informs us that Kámatá was invaded, about 1498 A. D., by Husain Sháh, and legends state that the town was destroyed and Nilamba, the last Kámatá Rájah, was taken prisoner. He escaped, however, and disappeared; but people believe that at some time in future he will be restored.

The Kámatá family was succeeded by the Koch dynasty, to which the present Mahárájá of Koch Bihár belongs. The new Rájás secured their possessions by erecting along the boundary a line of fortifications, many of which are still in excellent preservation.

The prevalence of human sacrifices in Koch Bihár is known from the *Ain*. The *Haft Iqlím* has the following: "There is a cave in this country, which, according to the belief of the people, is the residence of a Deo. The name of the Deo is Aí, and the people are zealous in their worship. Once a year they have a feast, when they kill all sorts of animals found in the country, believing that the meritoriousness of the slaughter comes from Aí. They likewise kill on the same day the Bhogís, who are a class of men that have devoted their lives to Aí, saying that Aí has called them. From the time they become Bhogís, they may do what they like; every woman is at their command, but after one year they are killed."

The first European traveller that visited Koch Bihár was Ralph Fitch. He says: "I went from Bengala into the country of Couche or Quicheu, which lies 25 days' journey northwards from Tanda. The king is a Gentile; his name is Suckel Counse;* his country is great and lieth not far from Cauchin China: for they say they have pepper from thence. The port is called Cacchegate.† All the country is set with bamboos or canes made sharp at both endes and driven into the earth, and they can let in the water and drown the ground above knee deep, so that men nor horses can pass. They poison all the waters if any wars be. Here they have much silk and musk and cloth made of cotton. The people have ears which be marvelous great, of a span long, which they draw out in length by devises when they be young. There they be all Gentiles, and they will kill nothing. They have

* Shukl Gosáin; vide my essay on Koch Bihár and Asám, *Journal, As. Soc. Bengal*, 1872, Part I, p. 53.

† I. e. the place where the merchants from China meet. Cacchegate is Chichá-kotá, north of the town of Koch Bihár and south of Baksa Fort, Long. 89° 35', in the Bengal Dúars. It is now British.

hospitals for sheep, goats, dogs, cats, birds, and for all living creatures. When they be old and lame, they keep them until they die. If a man catch or buy any quick thing in other places and bring it thither, they will give him money for it or other victuals, and keep it in their hospitals or let it go. They will give meat to the ants. Their smal mony is almonds, which often times they use to eate."

As Ralph Fitch mentions Chichákoṭá, and the 'Ālamgirnámah Kanthalbári,* as belonging to the Koch Bihár, it follows that portions of the Dúárs must have once belonged to Koch Bihár.

Aurangzib's army under Mír Jumlah took Koch Bihár on the 19th December, 1661, when the town was called 'Ālamgirnagar,† a name which has not come into use; and the imperial collectors expected to raise a revenue of eight lák'hs of rupees, whilst in Prince Shujá's rentroll of 1658 Koch Bihár is put down as yielding Rs. 3,27,794.

On Van den Broucke's map, the whole Himálaya tract, from northern Bihár to Ásám, is called 'T Ryk van Ragiawarra,' or the realm of Rájáwará and in the text he says, that "Ragiawara consists of several separate countries, which sometimes fight the Great Mogul, and at other times are forced to submit." Of these several countries he mentions on the map 'T Ryk van Morang and 'T Ryk van Jesval, which latter name is also given on Blaeu's map and will be remarked on below.

The Morang was entered by Mughul troops in the beginning of Aurangzib's reign. We first hear of an expedition led by Mirzá Khan, Faujdár of Darbhanga, and Iláh Virdí Khán, Faujdár of Gorák'hpúr, against the refractory zamíndár of Morang (beginning of 1075, or end of A. D. 1664). Mirzá Khan died during the expedition; but Iláh Virdí Khán returned with fourteen wild elephants and nine presentation elephants.‡ In the end of 1079 (beginning of 1669), Ma'çúm Khán reported that a false Shujá' had appeared in Morang and had caused disturbances there, and Ibráhím Khán and Fidái Khán received orders to capture him wherever he shewed himself, and to send his head to Court. Lastly, in 1087 (beginning of 1676), we hear of a conquest of Morang, but no particulars are given.

* West of Kanthalbári, the maps give a place called Mogulmurri [Mughulmárf], evidently the scene of a fight with Mughul troops. Another Mughulmárf lies between Bardwán and Jahánábád; a third between Medinípúr and Jalesar, where Akbar's troops defeated Dáúd Sháh (Kia translation, p. 376); and a fourth, eight miles north of Medinípúr.

† Thánah Sangrámgarh, one of Aurangzib's frontier thánahs near Noák'hálí, had received the same name in allusion to the title of the emperor.

‡ 'Ālamgirnámah, pp. 850, 875. *Maásur i 'Ālamgírí*, pp. 64, 150.

Blaev's Map of Bengal and of the Mughul Empire.

The map of Upper India by William and John Blaev (Pl. IV) is taken from their "Theatrum Orbis Terrarum," Amsterdam, 1645 to 1650, Vol. II,* and is based upon the Portuguese and Dutch charts that existed at the time, and upon the descriptions of European travellers. As far as Bengal is concerned, it is a reprint of De Barros' map, and represents, therefore, the knowledge which European geographers had of Bengal about 1540. In point of accuracy it is much inferior to Van den Broucke's map of 1660,† given in Valentyn's work. But the map is of great interest, as it helps us to unravel the difficulties in Terry's enumeration of the provinces of Bengal and other portions of the Dili empire,‡ which has also been followed by the Dutch traveller De Laët in his "India Vera" (Amsterdam, 1631), and of which traces may still be found on Van den Broucke's map. It is with a view to explain the extraordinary configuration of Bengal on the old maps that I have given the present chapter a place in this essay.

From a glance at the map, it will be seen that our early geographers had no information of the extent and situation of the countries which we now-a-days call the Central Provinces and Chutiá Nágpúr. Hence Gwáliár, Narwar, and (on Van den Broucke's map) Málwá, bound Bengal on the west; the Santál mountains are continued eastwards to meet the Ásám mountain-chains, and places belonging to the Central Provinces have been put north of Bengal.

Terry enumerates the following provinces as belonging to the Mughul empire—1. *Candahore*, Qandahár; 2. *Cubul*; 3. *Multan*; 4. *Haiacan*, Hájkán, a sirkár of Sindh; 5. *Buckor*, Bhakkar; 6. *Tatta*; 7. *Soret with Jonagar*, Sorat'h with Júnágarh; 8. *Jesselmeere*; 9. *Attok*; 10. *Peniab*, Panjáb; 11. *Chishmeere*, Kashmir; 12. *Banchish*, "the chief city is called *Bishur*; it lyeth east, somewhat southerly from Chishmeere, from which it is divided by the River Indus." Here we have the first misplacement. Terry means Bangash and Bajor (Sawád, Swat); but for *East*, he should have said *West*.

* Capt. J. Waterhouse drew my attention to a copy of this work in the Library of the As. Society.

† Mattheus Van den Broucke was Land-Voogd, or governor, of Choromandel, which included Bengal, from 1658 to 1664, during which time he compiled the map in the Vth Volume of the 'Beschryving van Choromandel' in François Valentyn's 'Oud en Nieuw Oost Indien', Amsterdam, 1728. (Library, As. Soc. Bengal, No. 2266.)

‡ Edward Terry was chaplain to Sir Thomas Row, the Ambassador to Jahángr's Court, and was later Rector of the Church at Greenford, Middlesex. He presented his 'Voyage to East India,' in 1622, shortly after his return to England, to the then Prince of Wales; but he only published it in 1655, when he was sixty-four years old.

13. *Jangapore*, "the chief city so called; it lieth upon the River *Kaul*, one of those five rivers which water *Peniab*." (?) De Laët has 'Jengapor or Jenupar,' between Lahore and Agra. 14. *Jenba*, east of *Peniab*, Chamba. 15. *Dellee*,* *Dihli*. 16. *Bando*; 'it confineth Agra to the west.' This is *Bándhú*, or *Bándhúgarh*, south-east of *Ágrah*. 17. *Malwa*; 18. *Ohitor*; 19. *Gujarat*; 20. *Ohandis*, *Khándesh*; 21. *Berar*, with the chief city *Shapore*;† 22. *Narwar*; 23. *Gwalior*; 24. *Agra*; 25. *Sambal*, *Sambhal*, or *Murádábád* District. 26. "*Bakar*, the chief city called *Bikancer*, it lyeth on the west side of the River *Ganges*." The whole remark seems to be erroneous. 27. *Nagracot*, *Nagarkot*, or *Kángrah*. 28. *Siba*, "the chief city is called *Hardware*.‡" 29. *Kakares*, the principal cities are called *Dekalee* and *Púrhola*." Terry means the Gakk'har District, the chief cities of which were *Dúngalí* and *Pharwálah*; *vide Áin* translation, p. 621. Terry also remarks that the *Caucasus* (*Himálaya*) divides *Kakares* from *Tartaria*, which accounts for its northern position on *Blaev's* map. 30. *Gor*, "the chief city so called; it is full of mountains; the River *Sersily*, a tributary unto *Ganges*, has its beginning in it." *Ide* 32.

31. *Pitan*, "the chief city so called; the River *Canda* waters it, and falls into the *Ganges* in the confines thereof." This is *Paithán*, the form used by *Abulfazl* for *Paṭhán*, or *Paṭhánkot*. Terry evidently means the whole hill tract of the *Sirnúr* range, as far as the *Alaknandá*. It is, however, possible that he meant the *Markandá*; but this river does not flow into the *Ganges*. The error in the position of *Pitan* is remarkable, as Terry, *DeLaët*, and *Blaev* give *Temmeri* (a Dutch spelling for *Dhamerí*, the old name of *Núrpúr*, near *Paṭhánkot*) between the *Rávi* and *Nagarkot* (*Kángrah*).

32. *Kanduana*, "the chief city is called *Karhakatenka*; the River *Sersily* parts it from *Pitan*. This and *Gor* are the north-east bounds of this Monarchy." There can be no doubt that *Kanduana* is *Gondwánah* (Central Provinces), of which the capital is *Garha-Katanga* (*Jabalpúr*); *vide Áin* translation, p. 367. If *Gor* is the north-east boundary of the empire, it is the *Gaur* of *Silhat*, mentioned above, or the *Gáro Hills*. *Sersily* is a misprint for *Sersity*, the *Saraswatí*, which after the *Jamuná* is the principal (legendary)

* "Which signifies an Heart, and is seated in the heart of the Mogul's territories." Terry. This unfortunate etymology shows however that Terry knew some Persian, because he cleverly disposes of the final *yá*. Similarly, he derives 'Khurasan,' from *خوش* *ro*; and 'Sultán Khurram' from *كرم* *karam*, liberality!

† *Sháh-púr*, built by Sultán Murád, Akbar's son, six *kos* south of *Bálápúr*, now in ruins.

‡ I do not know whether the country near *Haridwár* was ever called *Síbhá*. In the *Áin*, a parganah of the *Bíeat Jálándhar Dúáb* is called *Síbah*.

tributary of the Ganges. The map follows the legend and makes the Saraswati flow into the Ganges near Helobass (Iláhbás, the old name of Iláhábád).^{*} De Laët increases the confusion by calling the Sersily 'Perselis.' But the passage need no longer exercise commentators. Blaeu's map clearly shows how erroneously the early geographers arranged the provinces.

33. *Patna*, "the chief city so called; the River Ganges bounds it on the west; Sersily on the east; it is a very fertile Province."

34. *Jesual*, "the chief city is called Raiapore; it lieth east of *Patna*." Van den Broucke puts Jesual east of Morang; and Blaeu's map marks it as a country for elephants. It seems, therefore, that Raípur in the Central Provinces is meant, the elephant country *par excellence*, though the name 'Jesual' is not clear to me.

35. *Mewat*, "the chief city is called *Narnol*; it is very mountainous." This is Mewát, south-west of Dihlí, with Nárnol. I am at a loss to understand how Mewát could have been placed so far away from Dihlí; but Blaeu's map shows why Terry and De Laët mention it here. The error was not even detected by Van den Broucke, who places 'T Ryk van Mewat east of the Brahmaputra, south of 'Cos Assam.'[†]

36. *Udessa*. "the chief city called *Jekanat*; it is the most remote part east of this empire." De Laët says: It is the furthest province of this empire to the eastward, is adjacent to the Maug kingdom, whose inhabitants are most ferocious barbarians." DeBarros and Blaeu have avoided this mistake; Van den Broucke, however, places 'T Ryk van Udesse north of Bollua (Bhaluah), between Tiparah and the Brahmaputra. But Orísá and Jagannát'h are meant. The spelling Udessa is clearly a transliteration of اوريسا, Uḍesá, and DeLaët has overlooked the identity of 'Orisa' and 'Udessa.'

37. *Bengala*.

It would take me too far from my subject, were I to enter on the identification of the places in western India on Blaeu's map. I hope to do so at a future period, or would rather leave the task to Mr. E. Lethbridge, who has lately published valuable extracts from De Laët's work in the Calcutta Review.

* According to the legend, the Saraswati, which is lost in the sand east of Bhatinda District, joins the Ganges *below the ground* at Iláhábád. Hence at Tribeni and other places in Bengal, wherever two rivers leave the Ganges, we find the names Saraswati and Jamuná repeated.

† The London edition of 1655 has 'Jesuat.' De Laët has "Jesual, whose metropolis is Raiapore or Ragapore, lies to the east of Patna, and north-west of Bengala."

‡ Ásám is often called Koch Ásám.

PART II.—HISTORICAL.

The Muhammadan period of the history of Bengal may be conveniently divided into five parts—

I. The 'Initial period,' or the reigns of the governors of Lak'hnauli appointed by the Delhi sovereigns, from the conquest of Bengal by Muhammad Bakhtyár Khilji, A. D. 1203 to 1338 A. D.

II. The period of the independent kings of Bengal, from 1338 to 1538.

III. The period of the kings of Sher Sháh's family and their Afghán successors, from 1538 to 1576.

IV. The Mughul period, from 1576 to 1740.

V. The Nawábí period, from the accession of 'Alí Virdí Khán, in 1740, to the transfer of Bengal to the E. I. Company.

In the following pages, I shall principally treat of the first and second periods.

I.

THE INITIAL PERIOD (1203 TO 1338, A. D.)

The first period has been almost exhaustively described by Mr. E. Thomas in his 'Initial Coinage of Bengal,' published in the Journal for 1867, in which he details the results of his examination of selections made from 13,500 pieces of silver, accidentally found in Koch Bihár in August, 1863. I can, therefore, with regard to this period, merely give a few interesting inscriptions which have since turned up, and note a few coins—second gleanings from the Koch Bihár *trouvaille*—which are in the Society's cabinet.

Of the following inscriptions belonging to the Initial Period, one was received from General Cunningham, and the others from Mr. Broadley, who handed over to the Society in all twenty-two rubbings, which I have deciphered and translated. The original stones are either attached to old public buildings in the town of Bihár, or are preserved in the Museum of that place.*

No. 1. *The Tughral Inscription of Bihár.* [B. C.]

امر ببناء هذه العمارۃ فی ایام مملکۃ المجلس العالی خان الاعظم
خاقان المعظم عز الحق والدين غياث الاسلام والمسلمين مغیث الملوك
والسلطانين ابي الفتح طغرل السلطاني خلد الله ملكه العبد مبارك خان
البحارن تقبل الله منه فی المحرم سنة اربعین و ستمائة ۱۱

* Together with the rubbings, Mr. Broadley made over to the Society readings of several early Muhammadan coins of importance, and also a few notes on the Muhammadan buildings of the town of Bihár. The coins have since passed into the collection of Col. Guthrie, and have been published by Mr. E. Thomas in his 'Second Part of the Initial Coinage of Bengal' (about to be reproduced in this Journal). The "notes"

This building was ordered to be erected during the days of the reign of the Majlis i 'Alí, the great Khán, the exalted Kháqán, 'Izzul haq waddín, the help of Islám and the Muslims, the helper of princes and kings, Abul Fath Tughril, the Royal, may God perpetuate his reign! The slave, Mubarak Khán, the Treasurer,—may God grant acceptance!

In the month of Muharram, 640, [July, 1242, A.D.]

The inscription is a large slab of basalt, and is at present in the Bihár Museum. It was found let into brick work on the north side of the great Dargáh, to protect the doorway from rain. A photozincograph of it was published by me in this Journal for 1871, Pt. I, Pl. vii.

It is of interest to remark that South Bihár was under the Lak'hnaúti governors from Bakhtiyár Khiljí's time.

Tughril in 631 (A. D. 1233-34) succeeded Saifuddín Aibak as governor of Lak'hnaúti, in which office he continued till the 5th Zí Qa'dah 642 (or 4th April, 1245), on which day he was forced to cede his office to Qamaruddín Timur Khán. Tughril was appointed to Audh; and Timur Khán remained in Lak'hnaúti till 29th Shawwál, 644, (or 9th March, 1247) on which day both he and Tughril died.*

The following are the governors of Bengal from Saifuddín Aibak to Bughrá Khán. The dates differ slightly from Mr. Thomas's list on p. 8 of his 'Chronicles.'

Saifuddín Aibak. Dies at Lak'hnaúti in 631. *Tabq.*, p. 239.

'Izzuddín Abul Fath Tughril Tughán Khán, governor from 631 to 5th Zí Qa'dah, 642. *Tabq.*, p. 245. He withdraws to Audh, and dies on the 29th Shawwál, 644.

Qamaruddín Timur Khán, governor from 5th Zí Qa'dah, 642, to 29th Shawwál, 644, when he, too, dies. *Tabq.*, p. 246.

Ikhtiyáruddín Yúzbak Tughril Khán, proclaims himself king under the title of Sultán Mughisuddín. Perishes in Kamrúp. *Tabq.*, p. 263. No dates are given.

Jaláluddín Mas'úd, Malik Jání Khiljí Khán, becomes governor on the 18th Zí Qa'dah, 656 (or 17th Nov., 1258). *Tabq.*, pp. 206, 225.

'Izzuddín Balban, was governor in 657, in which year he was attacked by Tájuddín Arsalán Khán Sanjar i Khwárazmí, who, however, was captured or killed by 'Izzuddín. *Tabq.*, p. 267.†

are of little value, and are moreover incomplete, so that I can only give my readings and translations of the Bihár inscriptions. They are marked 'B. O.' (Bihár Collection.)

* *Tabaqat i Nágiri*, pp. 245, 246, where Tughril is called Tughril Tughán Khán. Hence the *táríkh* on p. 246 is wrong, and for *sin* we have to read *mím*. 'Tughril' signifies a kind of falcon or hawk, and *tughril shudan*, like *shunqar shudan*, means 'to die,' 'Shunqar' also is a kind of falcon.

† Hence Tájuddín Arsalán Khán should not be put among the governors of Bengal.

Muhammad Arsalán Tatar Khán, son of Arsalán Khán Sanjar. He had been for some time governor, when the emperor Balban ascended the throne (664). *Baraní*, p. 66. After a few years he was succeeded by

Tughril, who proclaimed himself king under the name of Sulṭán Mughísuddín. His fate has been mentioned above. No dates are given.

Bughrá Khán, Náçiruddín Mahmúd, second son of emperor Balban.

No. 2. *The Bárahdarí Inscription of Bihár.* [B. C.]

This inscription also belongs to the time of the early governors of Bengal; but unfortunately the first half with the name of the governor is wanting. Its date however, A. H. 663, shews that it belongs to the time of Muhammad Arsalán Tatar Khán, governor of Bengal in the end of the reign of Náçiruddín Mahmúd of Dihlí. The inscription was found in the yard facing the shrine of Sháh Fazlullah, Bárahdarí Mahallah, Bihár.

• • • • • الله و امراته و ابقى في ديار الممالك عمارته ببناء هذه المقبرة المتبركة شہرستہ
• • • • • العدل الرفاة المخصوص بعناية الرحمن • • • سلطان شاه نور اللهم تزيده و
بيض غرته واجعل قبره روضة من رياض الجنان و لا تجعل حفرة من حفر النيران
في ليلة الاحد الثامن عشر من جمادى الاولى سنة ثلاث و ستين و ستمائة و المعمار
عبدھما المؤمنون بانعامهما مسجد الكابلي ॥

• • may God (perpetuate) his rule and governorship, and may He cause his edifice to remain in the realm • • by the erection of this blessed tomb in the months of the year • • Sulṭán Sháh, (O God, illuminate his grave, and whiten his forehead, and make his grave a garden of the gardens of Paradise, but do not make it a pit of the pits of fire!). On Saturday evening, the 18th Jumáda I, 663. The architect is their slave, who is obliged by their rewards, Majd of Kábul. [8th March, 1265.]

No. 3. *The Kai Káús Inscription of Kagol.* Pl. V, Nos. 1 and 2.

A rubbing of this inscription was received from General Cunningham. Its date is, curious to say, the same as that of the Kai Káús inscription of Gangarámpúr, published by me in the Journal, for 1872, p. 103. Mr. Thomas has published coins of this king, bearing the dates 691, 693, 694, 695 (Chronicles, p. 119), and the cabinet of the As. Soc. of Bengal contains two clear specimens of 691, and 696 (Lak'hnautí mint).

The inscription is—

وقو (؟) لبناء هذا المسجد الجامع في عهد الدولة السلطان المعظم
مالك رقاب الامم مولوي ملوك الترك والعجم صاحب التاج والخاتم
ركن الدنيا • • • • • س شاه السلطان بن سلطان بن سلطان يمين خليفة
الله ناصر امير المؤمنين في نوبت الخان الاعظم خاتان المعظم اختيار
الحق والدين خان خان الشرق والتصين سكندر الثاني فيروز ايتكين السلطان

* The text has a dual.

حَدَّ اللَّهُ دولته * * * * * المظفر المنصور الغازي ضياء الدولة والدين
 الغ خان ادام الله دولته وزاد خيره في الغرة من المحرم سنة سبع
 وتسعين وستمائة ۱۱

This Jāmi' Mosque was built during the reign of the great Sultān, the owner of the necks of nations, the master of the princes of the Turks and the Persians, the lord of the crown and the signet, *Buknuddunyá waddín* [Kai Káús] Sháh, the king, son of a king who was the son of a king, the right hand of God's Viceregent, the helper of the Commander of the Faithful, and during the governorship of the great Khán, the exalted Kháqán, *Ikhtiyár ul haq waddín*, the Khán of the Kháns of the East and of China, the second Alexander, *Fírúz Aitigin Sultán*, (may God perpetuate his rule!) ** [by] the victorious, the invincible, the champion, *Ziyad dula h waddín Ulugh Khán*, may God perpetuate his rule and increase his benefits! On the 1st day of Muharram, of the year 697. [19th October, 1297]*

* This inscription contains what Mr. Thomas calls an unusual reiteration of the words *ibnu sultān ibni sultán*, which is perhaps more unusual on coins than on inscriptions. But the spirit of pride that breathes in the words is apparent, when we compare with it the legend of the coins struck in Tihut by the rebel Bahádur, given in Badāoní II, p. 298.

In Raziya's Bengal coinage (Thomas, *Chronicles*, p. 107), I read for مهره, which has no sense, ممدده, *mumuddatu*, 'the helper,' the same as ناصره. 'Raziya' stands for 'Raziya't unnis', i. e. one who among women is looked upon with favour.

I also take this opportunity to give my reading of the Náqiruddín Mahmúd Inscription, published by Mr. Thomas in his *Chronicles*, p. 129, an inscription which in style is similar to the above Kai Káús inscription. General Cunningham has favored the Society with a rubbing of it.

[بني] هذه العمارة في عهد مملكة السلطان الاعظم مالك رقاب الامم ناصر
 الدنيا والدين سلطان السلاطين ذى الامان لاهل الايمان وارث ملك سليمان
 صاحب الخاتم في ملك العالم ابي المظفر محمود بن السلطان خلد الله ملكه و
 سلطانه بامر الملك العالم الكبير اعظم قتلغخان بها الحق والدين ملك ملوك
 الشرق واليهن بابن الشمسي في ايام اياته دامت معاليه في العاشر من رجب
 سنة اثني وخمسين وستمائة ۱۱

'This building was erected during the reign of the great Sultān, the owner of the necks of nations, *Náqiruddunyá waddín*, the king of kings, who protects the people of the Faith, the heir of the kingdom of Solomon, the lord of the signet in the kingdom of the world, *Abul Muza'far Mahmúd Sháh*, the son of the king (may God perpetuate his rule and kingdom!), by order of the learned and great Malik, *A'sam Qutluq Khán Baháulhaq waddín*, the Malik of the Maliks of the Eastern Provinces and China, *Balban* the Shamai [slave of Shamsuddin Iltitmiš], during the period of his governorship, may his high qualities endure! On the 10th Rajab, 662.'

From this it will be seen that *A'sam Qutluq Khán* (Balban) does not call himself *Malik ul 'Alam* 'the Malik of the world,' but *al-malik ul 'dilm*, 'the learned Malik.'

The reading of the name 'Aitigin' or 'beautiful moon,' in this inscription was suggested by Mr. Redhouse, and I gladly correct my reading Itgin in the Kai Káús inscription, published by me in the Journal for 1872, p. 103, where the correct name of the builder is Zafar Khán Bahrám Aitigin, the Royal (*sulṭání*).*

The date of this inscription is the latest yet discovered of Kai Káús's reign.

Kai Káús seems to have been succeeded by his brother Shamsuddín Fírúz Sháh (I). Mr. Thomas quotes coins of this king, dated 702, 715, 720, 722, and the cabinet of the Asiatic Society of Bengal has three specimens, struck at Lak'hnaúti, with clear dates 706 and 715, and (slightly doubtful) 710.

Three inscriptions of Fírúz Sháh have hitherto been found, of which one, dated 1st Muharram, 713, or 28th April, 1313, was published by me in this Journal, for 1870, Part I, p. 287.† The other two inscriptions are from Bihár, and are dated 709 and 715. They reveal that Fírúz Sháh had a son Hátim Khán,‡ who in those two years, and probably in the interval, was governor of Bihár.

No. 5. *The Fírúz Sháh (I) Inscription of Bihár.* [B.C.]

بنى هذه العمارة المزیدة (؟) فى عهد السلطان الاعظم شمس الدنيا
والدين ابى المظفر فيروز شاه السلطان خلد الله ملكه وسلاطانه ونوبة ايالة
البحان العادل البازل الغازى * * الحق حاتم خان ابن السلطان خلد ملكه
وساوانه العبد الضعيف محمد حسين تكهري في شهور سدة تسع وسبعماية اا

This (additional?) building was erected in the reign of the great Sultán Shamsuddunyáwaddín Abul Muzaffar Fírúz Sháh, the king, (may God perpetuate his kingdom and his rule!) and during the governorship of the just and liberal Khén, the champion of God, ** Hátim Khán, the son of the king, may God perpetuate his rule! The weak slave Muhammad Husain Tak'harori. During the months of the year 709. [A. D., 1309.]

A plate of this inscription was published in this Journal, for 1871, Part I, Pl. viii. The inscription itself is attached to a lofty gateway, which together with an arched hall, fast falling to decay, and a roofless mosque, forms the remains of what tradition calls Hátim Khán's palace. It stands on a gentle eminence, due east of the Bihár mountain.

* Or, we might at once translate, 'the Sultán;' for *sulṭání*, as abstract noun, occurs on numerous coins; vide Proceedings A. S. Bengal, for June, 1870, p. 152. The translation of the other portions of the inscription is here confirmed.

† Where in the third line for الاكرام read الاكرم.

‡ Besides the four sons mentioned by Mr. Thomas, *Chronicles*, p. 149.


No. 6.

بنى هذا المسجد فى نوبة السلطان الاعظم شمس الدنيا والدين ابراهيم
 فيروز شاه السلطان و ايام اماره خاقان الزمان المحاطب بكاهن خان ادام الله
 ظلالهما العبد الوائق بالله و لكرمه الراجى احقر الخلائق بهرام بن حاجى
 تاب الله عليه و غفر لوالديه فى الغرة من رجب سنة خمس عشرة
 و سبعمائة

* This mosque was built in the reign of the great Sultán Shamsuddunyá waddín Abul Muzaffar Fírúz Sháh, the king, and during the governorship of the Kháqán of the age, known as Hátim Khán, may God cause their shadows to last! The slave, who trusts in God and hopes for His mercy, the meanest of mankind, Bahrán, son of Hájí, may God turn to him and may He pardon his parents!

On the first day of the month of Rajab of the year 715. [1st October, 1315.]

This inscription, a fine slab of basalt, leans against the wall of the Chhotá Dargáh in Bihár.

Two other sons of Fírúz Sháh, Shihábuddín Bughdah Sháh and the well known Ghiyásuddín Bahádur Sháh, struck coins as 'kings of Bengal' during the lifetime of their father. Of the former, Mr. Thomas says (Chronicles, p. 194)—"Neither history, incidental biography, nor numismatic remains avail to do more than prove the elevation, as they seem to indicate the brief and uneventful rule, of Shihábuddín Bughdah Sháh. No date or place of mintage is preserved." However, the cabinet of the Asiatic Society possesses two specimens,* one of the same kind as published by Mr. Thomas (Chronicles, Pl. VI, No. 4), and a new variety, containing the same legend, but with the letters, on the obverse, close together, and with a  instead of the star on the reverse. The former fortunately contains a complete margin, with the clear legend—

ضرب هذه الفضة لكهنوتي سنة ثمان عشر و سبعمائة

This silver coin was struck at Lak'hnauti in the year 718.

Mr. Thomas looks upon the *d* in the name of this king as the Hindi *ḍ*, which is so often interchanged with *ṛ*. This may be the case, inasmuch as Shiháb, according to Muhammadan custom, would assume the name of his grandfather بغرا, *bughrá*;† but in India, people seem early to have substituted a *dál* for the *re*; hence we find in the *Ain* the form بغدى *bughdí*.‡

Ghiyásuddín Bahádur Sháh was the last of the Balbaní kings of Bengal. "In A.H. 738, Muhammad ibn i Tughluq is found issuing his own coin in

* Evidently Bábu Rájendraśála Mitra's selections from the Koch Bihár hoard.

† Which signifies a male 'Bactrian camel' (with two humps). The spellings given in dictionaries are بغور - بغور - بغر - بغرا - بغرا.

‡ Vide my *Ain* translation, p. 148.

Bengal, and Bahádúr, defeated and put to death, contributed an example to insurgent governors in his own skin, which was stuffed and paraded through the province and the empire."* And already the year before, we find that a palace had been built, or renovated, in Bihár for the Imperial *Nadb*, which tradition still calls the 'sukúnat,' or residency.

No. 7. *The Sukúnat Inscription of Bihár.* [B.C.]

بسم الله الرحمن الرحيم
 شد بنجدید عمارت این دروازه عالی عالم آرای و ابن طاق رفیع فلك ساي در ایام
 خلافت خلیفه جهانپناه آسمان بارگاه خدایگان سلاطین گیهان فرمان فرمای عالمیان
 ذی الامن والامان لاهل الالبان وارث ملک سلیمان ابو المعجده محمد بن
 تغلقشاه السلطان خلعت خلافت و سلطانه فی الغرة من الشهر المبارکی رمضان سنة
 اثني وثلاثين و سبعمائة ۱۱

This high and world-adorning gate, and this lofty, heaven-touching portico, were renewed in the reign of the Khalifah, the asylum of the world, whose court is the heaven, the Lord of the kings of the universe, the ruler of mankind who gives security and safety to the people of the Faith, the heir of the kingdom of Solomon, Abul Muzáhid Muhammad, son of Tughluq Shah the Sultán, (may his kingdom and rule be perpetuated!). On the first day of the blessed month of Ramusán, 732, A. H. [27th May, 1332].

From this time till the beginning of the 10th century, Southern Bihár as remarked above, remained detached from Bengal, and followed the fortunes of the empires of Dihli and of Jaunpúr.

Muhammad Tughluq's governors of Lak'hnautí, Sátgáon, and Sunnár-gáon did not long remain undisturbed, and the death of Bahrám Khán, governor of the last province, was the commencement of new revolutions, which led to the establishment of a line of independent kings.

II.

THE SECOND PERIOD, OR THE PERIOD OF THE INDEPENDENT KINGS OF BENGAL (1338 TO 1538, A.D.)

For this period I shall take the kings singly, and collect for each reign whatever new information I have been able to gather from the rubbings received from General Cunningham, Dr. J. Wise, and Mr. E. V. Westmacott, C. S., and from unpublished Bengal coins in the Society's cabinet.

I have also compared the corresponding chapter of the *Riyásus-saláfiyyin* with the statements given in the *Ṭabaqát i Akbari* and in *Firishtah*.

The line of the independent kings commences with

I. Fakhruddīn Abul Muzaffar Mubārak Shāh.

He had been *Silāhdār*, or armour-bearer, to Bahrām Khān, the Dihlī governor of Sunnārgāon, and on his master's death in 739 A. H., or 1338 A.D., proclaimed there his independence.

According to the *Ṭabaqāt i Akbarī*, *Firishtah*, and the *Riyāz ussalāṭīn*, Mubārak Shāh was killed by 'Alī Mubārak in 741, after a reign of two years and some months.* But as his coins extend over a period of more than ten years, from 739 to 750, it looks as if the date given in the histories should be corrected to *ده سال و چند ماه*, 'ten years and some months.' Mr. Thomas is willing to antedate Mubārak Shāh's accession to 737; but the coins (*Chronicles*, p. 263, and Plate vi, fig. 7) do not satisfactorily prove this, because the reading *سبع*, in the absence of diacritical marks, is more likely *سبع*, which the histories give, especially because the numerous coins hitherto found do not give the intervening year (738).

The name 'Mubārak Shah' has been proved by coins, the histories only call him Sultān Fakhruddīn or more familiarly still, Fakhrā.† Ibn Baṭūṭah also mentions him under the name of Fakhruddīn, and says that he was an eminent man, kind to strangers and Ḡūfis.‡

Mubārak Shāh's son is mentioned below. His son-in-law Zafar Khān fled from Sunnārgāon over Tattah to Fīrūz Shāh in Dihlī, who, at his request, invaded Bengal a second time in the beginning of Sikandar Shāh's reign.§

II. 'Ala'uddīn Abul Muzaffar 'Alī' Shāh.

Regarding this king the *Riyazussalāṭīn* has the following :

'It is said that Malik 'Alī Mubārak, who as king is styled Sultān 'Alāuddīn, was a trusted servant of Malik Fīrūz [subsequently Fīrūz Shāh III. of Dihlī], and Malik Fīrūz was brother's son to Sultān Ghiyāsuddīn Tughluq Shāh, and son of the paternal uncle of Muḥammad Shāh. Muḥammad Shah, in the first year of his reign, made Malik Fīrūz his Nāib-Barbak. Now at this time, Hāji Ilyās, the foster-brother of 'Alī Mubārak, did something wicked and fled from Dihlī. Malik Fīrūz asked 'Alī Mubārak what had become of Hāji Ilyās. 'Alī Mubārak went in search of him; and when he found no trace of him, he told Malik Fīrūz that Hāji Ilyās had run away. Fīrūz scolded him and told him to leave his presence. 'Alī

* The *Riyāz* has five months. Stewart places his death in 743; but all histories have 741.

† Dowson, *Elliot's History*, III, p. 304.

‡ See Ibn Baṭūṭah, p. 195.

§ These facts are only mentioned by Shams i Sirāj, who moreover places Fakhruddīn's defeat and death immediately after Fīrūz Shāh's first invasion of Bengal in 754. This is clearly a few years too late.

Mubárák now went to Bengal. On his way, one night, he had a dream and saw the revered saint Jaláluddín Tabrizí, who said to him, "I will give thee the kingdom of Bengal; but thou wilt have to build me a vault." 'Alí Mubárák put the finger of acceptance on his eye, and asked where it was to be built. The saint replied, "In the town of Panđuah at a place where thou wilt see thirty bricks one over another, and below them a fresh rose of a hundred petals."

'When 'Alí Mubárák arrived in Bengal, he entered the service of Qadar Khán, [the Imperial governor of Lak'hnaúti] and received from him the command (*bakhshigari*) of the army. But when Fakhruddín revolted against Qadar Khán, 'Alí Mubárák killed his benefactor, and proclaimed himself king under the title of Sultán 'Aláuddín. He then made war upon Fakhruddín, and slew him "as a punishment for having killed his benefactor." Leaving thanahs in (the province of) Lak'hnaúti, 'Aláuddín marched to subjugate other parts of Bengal. But from the time he had proclaimed himself king, the whirlpool of pleasure had made him forgetful of his promise to the Saint, when one night Jaláluddín again appeared to him and said, "O Sultán 'Aláuddín, thou art now king of Bengal, but me thou hast forgotten." The king next day at once searched for the bricks, and found them just as the saint had described. There he built the vault, the ruins of which exist to this day.

'Now about this time Háji Ilyás also arrived in Panđuah. Sultán 'Aláuddín put him into prison, but after some time, at the request of his mother who had been Sultán 'Aláuddín's nurse, he set him at liberty, and allowed him to come to court. Háji Ilyás, in a short time, found means to gain over the army, killed 'Aláuddín with the help of the eunuch, and proclaimed himself king under the name of Shamsuddín Bhangrah.

'The reign of Sultán 'Aláuddín lasted one year and five months.'

This extract is so far satisfactory, as it explains the relation between Fírúz Sháh, 'Alí Mubárák, and Háji Ilyás.

The evidence of coins, as in the case of the preceding king, gives 'Aláuddín 'Alí Sháh a longer reign than the histories. Mr. Thomas (*Chronicles*, p. 265) gives a coin of the year 742, and he adds that he has seen coins of 744, 745, 746. There is nothing strange in the name '*Alí Mubárák*, which he thinks has arisen from "a strange jumble of Muhammadan writers, who endowed 'Alí Sháh with the surname of his adversary Mubárák Sháh;" for 'Alí Mubárák is as common a name as Mubárák 'Alí, and the histories say that this was 'Alí Sháh's name before accession.

From the fact that the coinage of Mubárák Sháh is restricted to the Sunnárgráop mint, and that of 'Alí Sháh to Fírúzábád (*i. e.* Panđuah), we may conclude that the former held Eastern, and the latter Western Bengal.

But 'Alí Sháh was vigorously opposed by Háji Ilyás, who struck coins

in Paṇḍuah, 'Alī Shāh's capital, in 740 and 744, and in uninterrupted succession from 746 (probably the correct year when 'Alī Shāh was overcome by him) to 758.

III. Ikhtiyāruddīn Abul Muzaffar Ghā'zī Shāh.

Fakhruddīn Mubārak Shāh was succeeded in Eastern Bengal by Ikhtiyāruddīn, who styles himself "son of the Sultān." We may, therefore, accept Mr. Thomas's hypothesis that he was the son of Mubārak Shāh. Coins are the only testimony on which the name of this king of Eastern Bengal has found a place in the list of kings. The figure of one of the coins given by Mr. Thomas, as also the specimen in the cabinet of the Bengal Asiatic Society, shew the year 753.*

IV. Shamsuddīn 'Abul Muzaffar Ilyās Shāh.

The relation of this king to 'Alāuddīn 'Alī Shāh and Fīrūz Shāh III. of Dihlī has been mentioned above. Having in 746 become master of Western Bengal, he established himself, in 753, in Sunnārgāḍī (Thomas, p. 269), and thus founded a dynasty, which, with an interruption of about forty years in the beginning of the 9th century of the Hījah, continued to rule over Bengal till 896 A.H.

Ilyās Shāh's successes in Eastern Bengal were followed by an attempt to extend the western boundaries of the kingdom, and according to the *Riyāz* he pushed as far as the Banāras district. In order to punish him, Fīrūz Shāh, in 754, after marching through Tirhut and Pūrniah, invaded Bengal and besieged Ekdālah. The defeat of Ilyās Shāh is almost humorously described by Ziyā i Baranī. But "the invasion only resulted in the confession of weakness, conveniently attributed to the periodical flooding of the country," and Fīrūz Shāh withdrew,† appointing collectors, apparently

* Thomas, *Chronicles*, Pl. VI, fig. 9. The margin clearly gives ۷۵۳. A figure with ۷۵۴ would be desirable, so that the reign of this king might be fixed from 751 to 758.

† It is said in the *Ṭabaqāt i Akbarī*, under Ilyās Shāh, that Fīrūz Shāh's expedition lasted from the 10th Shawwal, 754, till 11th Rabi' I, 755. As the latter date corresponds to the 5th April 1353, it could only have been *prospect* of the rains, not the setting in of that season, that drove Fīrūz Shāh back to Dihlī. The army, according to Baranī, complained of mosquitos in the vicinity of Paṇḍuah.

The 'Fīrūzpurābād,' mentioned by Stewart and quoted by Mr. Thomas (p. 264, note 2), where Fīrūz Shāh pitched his camp, should be 'Fīrūzpūr.' The *Riyāz* says—"At a place where now Fīrūzpūr lies (*bājās kih alyaum Fīrūzpūr ābdāst*, not *Fīrūzpūrābdāst*), Fīrūz Shāh pitched his camp, and starting from that place on horseback laid siege to the fort of Paṇḍuah. In the fort Sultān Shamsuddīn had left his son, whilst he himself had retreated to Fort Ekdālah, which is very strong." The maps shew several Fīrūzpūrs round about Gaur; thus two are south of the fort of Gaur.

for the first time, in Tirhut, and was glad in subsequent years to exchange presents with Ilyás Sháh.

As Háji Ilyás is the legendary founder of Hájpúr, opposite Patna, we may assume that in northern Bihár the Ghandak formed the frontier; in south Bihár, however, the frontier could not have passed beyond Munger, because the inscriptions preserved in the town of Bihár (*vide* below) shew that in 732, 737, 753, 761, 792, and 799, the town of Bihár was under Dihlí governors.

Just as Mubárák Sháh and 'Alí Sháh are called in the histories by their first name, so is Ilyás Sháh also invariably called Sultán Shamsuddín. The name 'Ilyas Khaje,' which Stewart gives, is not to be found in historical works. Stewart also mentions 760 as the year in which Ilyás died, but the histories only mention that his reign lasted sixteen years and some months. In 758, he had for the third time sent ambassadors with presents to Dihlí, and Firuz returned the compliment by sending him horses; but the Dihlí ambassadors on reaching Bihár heard that Ilyás had in the meantime died. The latest of Mr. Thomas's coins of Ilyás Sháh also bear the year 758.*

Ilyás Sháh is nicknamed 'Bhangrah,' a corruption, it seems, of the Hindústání *bhangérá*, 'a seller, or eater, of the drug *bháng* (hemp).' Firish-tah says that he does not know the origin of the word; but Ziyá i Baraní evidently knew more about it; for he says, rejoicing in his joke,—“And the well known Bengal Páiks, who for years had borne the name of ‘the Bengal Ancients’ or ‘the Dead,’ had taken a quid from Ilyás the Bháng-eater, in order to shew that they were ready to sacrifice their lives for him; and standing in front of the train of that wild maniac, together with the mouldy-looking Bangálí Rájahs, they bravely threw about their arms and legs; but as soon as the battle commenced, they put from fear their fingers into their mouths, gave up standing to attention, threw away swords and arrows, rubbed their foreheads on the ground, and were consumed by the swords of the enemies.” A graphic description, by the way, of the Bengal Military Police in 1858, A. D.

No inscriptions have hitherto turned up that mention Ilyás Sháh; nor does the author of the Riyáz, who had a good personal knowledge of the ruins of Gaur and Panduah, speak of any buildings erected by him. He only says—‘It is said that Sultán Shamsuddín made in Bengal a reservoir in imitation of Hauz i Shamsi at Dihlí.’

* Reinaud, however, quoted by Marsden (p. 566, note) mentions two Sunnárghas coins of 764 and 760. The MS. of the Riyáz belonging to the Asiatic Society of Bengal mentions 758 as the year in which the last ambassadors left for Dihlí; Stewart has 759, and the Tabaqát and Firishtah, who copies from it, have ‘in the end of 760.’ The earliest coin of Sikandar figured by Mr Thomas (Journal, As. Soc. of Bengal, 1867, Part I, p. 68, and Pl. II, No. 12) belongs to 761.

Regarding the coinage of Ilyás Sháh, *vide* Thomas, *Initial Coinage of Bengal*, Journal, As. Soc. Bengal, 1867, pp. 57, 58.

V. Abul Mujs'hid Sikandar Sha'h.

Ilyás Sháh was succeeded by his eldest son Sikandar Sháh. The beginning of his reign was marked by a second attempt* made by Firúz Sháh to annex Bengal; but as in the first, Ekdálah held out, and Firúz returned to Dihli, and never again interfered in Bengal matters.

'In 766,' says the Riyáz,† 'Sikandar commenced to build the Adínah [i. e. Friday] Mosque; but he had not finished it when he died, and the building remained half completed, and now-a-days parts of the edifice may be seen in the jungle near Panduah, about a *kos* from it. I have seen it myself: it is, indeed, a fine mosque and must have cost a great deal of money. May Sikandar's efforts be thankfully remembered!'

According to the same author, Sikandar Sháh died after a reign of nine years and some months—a statement also given in the *Tabaqát*—of wounds which he had received 'on the field of Goálpárah,' fighting with his favourite son Ghiyás, whom the machinations of a jealous step-mother had driven into rebellion.‡

'Sikandar was the contemporary of the revered saint 'Alául Haq.'

Several inscriptions belonging to Sikandar's reign have been found. One of the year 765, from Dinájpúr, was published by me in the *Journal* for 1872, p. 105. I remarked there on the beauty of its characters;§ but the inscriptions inside and outside the Adínah Mosque, rubbings of which the Society owes to General Cunningham and Mr. W. L. Heeley, are the finest that I have seen. The characters are beautiful, and the rubbings have created sensation wherever I have shewn them. The inscription inside is 13½ ft. long and 1½ ft. broad, but contains only verses from the *Qorán* [Sur. IX, 18, 19], on the top in Kufic and below in (what people call now-a-days in India)

* In 760, according to the *Tabaqát* and the *Riyáz*; Stewart has 761. Regarding Firúz Sháh's desire to reinstate Zafar Khán, Mubarak Sháh's son-in-law, in the government of Sunnárgáon, the cause that led to the expedition, *vide* Dowson, *Elliot's History of India*, III, 304, ff.

† Stewart has 763.

‡ Ghiyás marched with a large army from Sunnárgáon, and pitched his camp at Sunnárgarhi. Stewart has *Sunnárkos*. From the other side, his father issued forth with a terror-inspiring army, and the next day, on the field of Goálpárah, both parties engaged in deadly strife. The whole story is only to be found in the *Riyás*.

The Goálpárah meant here is, no doubt, the village quite close to Panduah, S.W. of it. I have not identified Sunnárgarhi.

§ It was written by one Ghiyás. General Cunningham is inclined to think that the Ghiyás is Sikandar's son.

Tughra characters. The stone outside measures 4 ft. 9 in. by 10 in., and its letters are just as beautiful.

No. 8. *The Sikandar Sháh Inscription, Adínah Mosque, Hazrat Panḍuah, A. H. 770, (vide Pl. V, No. 3).**

أمر ببناء العمارة هذا المسجد الجا ابا (٩) فى الدولة السلطان الاعظم
اعلم اعدل اكرم اكمل السلاطين العرب والعجم الرائق بتايد الرحمن ابو المجاهد
سكندر شاه سلطان بن الياس شاه السلطان خلد خلفته الى يوم الموعود
كتبه فى التاريخ ست رجب سنة سبعين و سبعمائة ١١

This.....mosque was ordered to be built in the reign of the great king, the wisest, the justest, the most liberal of the kings of Arabia and Persia, who trusts in the assistance of the Merciful, Abul Mujáhid Sikandar Sháh, the king, son of Ilyás Sháh, the king,—may his reign be perpetuated till the day of promise!

He wrote it on the 6th Rajab of the year 770. [14th February, 1369.]

Neither inscriptions nor coins give Sikandar Sháh a full *julús* name; he only has a *kunya*, Abul Mujáhid. Perhaps it would be going too far in speculations, if I were to say that Ilyás *naturally* called his son Sikandar; but a Muhammadan, on hearing the name of Ilyás, will immediately think of the *áb i hayát*, 'the water of life'; and as Sikandar is the legendary successor of Ilyás (the Prophet Elias) in search of the precious commodity, the name of the father may have suggested that of the son.

As stated above, the histories assign Sikandar Sháh a reign of nine years and some months. Stewart says that he died in 769, a year obtained by adding nine years and a fraction to 760, which he assumes to have been the year in which Ilyás Sháh died. The above Panḍuah inscription extends Sikandar's reign to the latter half of 770, and the coins figured by Mr. Thomas in his 'Initial Coinage' (J. A. S. B., 1867, Pl. II, Nos. 12, 14, and 13) give the dates 761, 782, and 783. But Mr. Thomas also states that among the large number of Sikandarsháhís that passed through his hands, he found coins of almost every year between 750 and 792, with the exception of the years 755, 762, 767, 768, 769, 774, 775, 777, and 778. It thus becomes clear that Sikandar Sháh struck coins as prince. Mr. Thomas also quotes A'zam Sháhí coins of 772, 775, 776, the years when Sikandar's coinage is most interrupted, and again from 790 to 799. Further, we have to remember that the poet Háfiz sent the well known ghazal

* I have elsewhere remarked on the numerous grammatical mistakes in Bengali Arabic Inscriptions. They consist chiefly in wrong articles, mistakes in gender, in oblique cases, and in wrong constructions of the Arabic numerals. In order not to disfigure the text, I shall no more indicate such errors by a (*sic*).

to Ghiyásuddín A'zam Sháh, 'king' of Bengal; and as Háfiz died in 791 (خاك مصلي being the date of his death), the ghazal must have been sent to Bengal during Sikandar Sháh's lifetime. The fact that A'zam Sháh's early coins (of A. H. 772) were struck in Mu'azzamábád (*vide* above), agrees with the statement of the Riyáz that he rebelled in Eastern Bengal, where he remained "nominally subordinate or covertly resistant to paternal authority."*

VI. Ghiyásuddín Abul Muzaffar A'zam Sháh.

The only fact given in the *Riyáz* and omitted by Stewart is that "A'zam Sháh was treacherously murdered (*ba-daghá kushtak*) by Rájah Káns "after a reign of seven years and some months,† or, as I have seen in a "little book, after a reign of sixteen years, five months, and three days."

The coins of this king, as mentioned before, go to 799; the latest figured by Mr. Thomas (Initial Coinage of Bengal, Pl. II, No. 15) is of 795.‡ No inscription of this and the following two kings have been found.

* It is also curious that in the inscription of 777, published by me in this Journal for 1870, p. 292, no king is mentioned, as if it had been doubtful who the real king was.

In order to remove all doubts regarding a confusion of سميعين and تسعين in the reading of Sikandar's and A'zam Sháh's coins, a few clear drawings of Sikandar Sháh's struck between 783 and 792, and of A'zam Sháh's, struck in 772, 775, 776, would be required. A'zam Sháh's reign, according to the common statement, lasted 7 years, which we certainly get when we subtract 792 (the latest year cited by Mr. Thomas for Sikandar Sháh) from 799 (the latest year cited for A'zam Sháh); but if we take the second statement, given in the *Riyáz*, regarding the length of A'zam Sháh's reign, viz. 16 years, 5 months, and 3 days, and subtract it from 799, we get 783, the year of Mr. Thomas's latest figured coin.

† I. e., according to the wrong chronology of the *Tabaqát* and the *Riyás*, in 775.

‡ I may here suggest a few unimportant alterations in Mr. Thomas's readings of A'zam Sháh's coins ('Initial Coinage,' J. A. S. B., 1867, pp. 68 to 70). First, عون الاسلام is to be corrected to غوث الاسلام. Again, the mysterious كين (*loc. cit.*, p. 68) is nothing but يمين, *yamín*. Lastly the reverse of coin No. 38 (*loc. cit.*, p. 70), as I see from a specimen in the Society's Coin Cabinet, is

بِإِذْنِ اللَّهِ وَخَلْدِ اللَّهِ مَلِكُهُ

May God render his power everlasting, and may God perpetuate his reign,—abbada alláhu, not the name 'Abdullah,—which removes from the mint officials the charge of ignorance. It was only Akbar who, in his hatred of everything that was Arabic, recommended the substitution of Alif for 'Ain, and y for ح, &c.

In the reverse of the Sikandar Sháhí (*loc. cit.*, p. 64, No. 23), as I also see from a coin in the possession of the Society, there is a wrong Alif before لَدِين and a و (*waw*) is omitted before اَلْقَدِيرُ,—"Who renders assistance to the religion of God, and who is victorious over the enemies of God." This cancels the footnote.

VII. Saifuddi'n Abul Muja'hid Hamzah Sha'h, son of A'zam Sha'h.

The histories give him the epithet of Sultán ussaláṭīn, and praise him for his virtues. *Firishtah* says :—" And the Rájahs of the country did not draw their heads out of the yoke of obedience and practised no neglect and delay in paying taxes."

According to the *Ṭabaqát*, he reigned ten years. But the author of the *Riyáz* saw " in the little book," that the reign of this king was 3 years, 7 months, and 5 days, which would bring his reign to 802, or 803, A. H.

MarSDen has published a coin of this king, without, however, giving the Royal name (Numism., Pl. XXXVII, No. DCCLIV). It follows in appearance the coins of Sikandar Shah and A'zam Sháh; the margin contains 'Fírúzábád,' but no year. The specimen in the cabinet of the Asiatic Society is of very rude manufacture, and has most clumsy letters, especially on the reverse.

Vide Pl. VII, No 1. Silver. Weight, 162 505 grains. A. H. (80)4. (Asiatic Society of Bengal, one specimen.) Rare. Circular areas.

OBVERSE—المؤيد بنائيد الرحمن سيف الدنيا والدين المولجاهد حمزة شاه
بن اعظمشاه السلطان

REVERSE—ناصر الاسلام والمسلمين

MARGIN—سنة اربع * * *

Assisted by the assistance of the Merciful, Saifuddunyá waddīn Abul Mujáhid Hamzah Sháh, son of A'zam Sháh, the king. The helper of Islám and the Muslims * * year * * 4

VIII. Shamsuddi'n P P, son of Saifuddi'n Hamzah Sha'h.

The *Ṭabaqát* says that this king followed the path of his father, and died after a quiet reign of three years and a few months. *Firishtah* states that as the king was young and deficient in intellect, an infidel of the name of Káns, who was an Amír of the court, obtained great power and influence, and usurped the executive and the collection of taxes. The *Riyáz* has the following : " After enjoying himself for some time, he died, in 788, from an illness, or through the foul play of Rájah Káns, who at that time was very powerful. *And some writers have asserted that this Shamsuddin was no son of the Sultán ussaláṭīn, but an adopted son (mutabanni), and that his name was Shihábuddín. Anyhow, he reigned 3 years, 4 months, and 6 days.* It is clear that Rájah Káns, who was zamíndár of Bhatúriah, rebelled against him, killed him, and usurped the throne."

THE SAINTS OF GAUR AND HAZRAT PANDUAH.

Before proceeding in my account of the kings of Bengal, it may be convenient here to collect the information which we possess regarding the

* I. e., according to the erroneous chronology, he would have died in 785.

Muhammadian saints of Gaur and Panḍuah. Their names often occur in Bengal History, while their dargáhs, as elsewhere, are the natural depositories of inscriptions.

The principal personages of saintly renown are Shaikh Jaláluddín Tabrizí, Shaikh Akhí Sirájuddín 'Usmán, Shaikh 'Aláulhaq, and Núr Quṭb 'Klam.* All larger works on Muhammadian Saints contain biographical notices of them.

1. *Shaikh Jaláluddín Tabrizí.*

He was a pupil of Abú Sa'id Tabrizí and of the renowned Shaikh Shiháb-uddín Suhrawardí. He accompanied the latter on his pilgrimages to Makkah, and used to carry on his head a small oven with the hot pots in which his master kept his food. Numerous miracles are ascribed to him. Among others, he converted, with one look, at Badáon a Hindú milkman to Islám. Though several times charged with immoral practices, he defeated his accusers. When he went to Bengal, he commenced to destroy idols; in fact, his vault occupies the site of an idol temple. He kept a *langarkhánah*, where he housed and fed beggars and travellers. He died in 642 A. H., or A. D. 1244. The place where he died does not seem to be accurately known. The Mutawallís of the tomb near Gaur say that he died in Aurangábád (the old K'harkí), and that his shrine in Bengal† is a mere *jawáb*, or imitation-vault; but the *Áin i Akharí* (IVth book) says that he was buried at Bandar Díú Mahall.‡ *Vide* below under Yúsuḥ Sháh.

2. *Shaikh Akhí Sirájuddín 'Usmán.*

Siráj came as a boy to Nizámuddín Auliá of Dihlí, who handed him over to Fakhruddín Zarrádí to teach. In course of time, he became very learned, and was told to go to Bengal, where he died in 758, A. H., or 1357, A. D. The *Haft Iqlím* says that Nizám called him 'the mirror of Hindústán,' and that he only received, when advanced in age, proper instruction from Fakhruddín. After Nizám's death, he went to Lak'hnaúti, and all the king became his pupils.

For the inscriptions at his tomb, *vide* below under Husain Sháh.

* Besides these, the Riyáz mentions a Shaikh Rájá Bayábání (died in 754, when Fírúz besieged Ilyás Sháh). Shaikh Hamíd of Nágor, one of Núr Quṭb 'Klam's teachers, belongs to Nágor in Jodhpúr, not to Nágor in Bírghúm, as Stewart says.

† As most Dargáhs in Bengal, Sháh Jalá's tomb is rich. Its lands lie chiefly in Bardwán District, at Bohát, near Maimári, a station on the E. I. Railway. There is a Madraṣah and a Saráí in Bohát.

The oven is still shewn at the Gaur shrine, and "till three generations back, it cooked rice without fuel."

‡ I. e., either the Maldives, or Díú in Gujarát. *Vide* Dowson, IV, 96, note.

8. *Shaikh 'Aláuddín 'Alá-ulhaq.*

'Alá-ulhaq was the son of Shaikh As'ad of Láhor, and one of the spiritual successors of Shaikh Akhí Sirájuddín 'Usmán. According to the *Ma'aríj-ulwilyáyat*, he was a true Quraishí Háshimí, and traced his descent from Khálid bin Walíd. He was at first exceedingly proud of his origin, wealth, and knowledge, so much so, that Shaikh Akhí complainingly told Nizámuddín Auliá that he was no match for 'Alá-ulhaq. But Nizám told him not to mind it, as 'Alá would in time become his (Akhí's) pupil. It seems that 'Alá in his pride called himself *Ganj i Nabát*,* and when Nizám heard this, he cursed him, and said, "May God strike him dumb!" The curse instantly took effect; nor was 'Alá-ulhaq's tongue loosed till he became the humble pupil of Shaikh Akhí. As Shaikh Akhí travelled a great deal on horseback, 'Alá-ulhaq accompanied him walking barefoot and carrying his master's pots filled with hot food on his head, till he became quite bald. Nor did he feel concerned when Shaikh Akhí, with a view of humbling him, passed on his journey the houses of his brothers, who were all Amírs and rich men.

Once some travelling faqírs came to 'Alá-ulhaq's cell. One of them had a cat with him;† but whilst in 'Alá's house, the cat was lost. The owner asked the saint to 'make' him a new cat; but when 'Alá said that he did not know from what to make one, he replied, "What do I care from what you make it, make it out of the horn of a stag, if you like." 'Alá was annoyed and said, "You shall feel the horns." Thereupon another of the faqírs, in order to vex the saint, said, "Well, can I make a cat from my testicles?" and 'Alá replied, "There you shall feel it." When the faqír had left the house, the former was killed by an ox, and the second got an attack of orchitis, of which he died.

'Alá-ulhaq spent large sums in feeding pupils, beggars, and wanderers. But the king of the land got envious, because the public treasury even could not have borne such a heavy expenditure, and he drove the saint to Sunnargáoṇ. He stayed there for two years, and gave his servants orders to spend twice as much as before. And yet, he only possessed two gardens, the income from which was eight thousand silver tankahs *per annum*; but as he gave a beggar the land as a present, all money must have been supplied him from the unseen world.

* Faríduddín 'Attár, the great saint of Pák Paṭan (Ajodhan) in the Panjáb has the title of *Ganj i Shakar*, 'store of sugar.' But *shakar* may be unrefined, whilst *sabdt* is applied to the best refined sugar. 'Alá-ulhaq, therefore, placed himself above Faríd.

† What the dog is to Europeans, is the cat to Indians. To kill or lose a cat is most unlucky.

'Alá-ulhaq died on the 1st Rajab, 800, or 20th March, 1398, and his tomb is at Hazrat Panduah.

4. *Shaikh Nûruddîn Nûr Quṭb 'Ālam.*

He is the son and spiritual successor of 'Alá-ulhaq. In order early to practise the virtue of humility, he washed the clothes of beggars and wanderers, and kept the water constantly hot for ceremonial ablutions; nay, he even swept the cell of his father and cleaned the privies attached to the house. One day, whilst thus engaged, his pure body was polluted, and his father allowed him to proceed to other work, as woodcutting. He refused the invitation of his worldly brother A'zam Khán, who was the Vazir at the court of Muhammad Tughluq.*

Quṭb 'Ālam died in 851, or A. D. 1447, and lies buried at Panduah. The words *shams ul hiddyat*, 'lamp of guidance,' are 'the *tarîk*h of his death. He was succeeded by his sons Rûf'atuddîn and Shaikh Anwar.

IX. *Rājah Káns.*

We saw above that Shamsuddîn (II.)—a king whose existence and royal titles have not yet been verified by medallie or mural evidence—was dethroned by Rājah Káns. This Rājah, at the present stage of research, belongs to legends and traditions rather than to authenticated history, there being little else known of him besides the fact that through him the succession of kings of the house of Ilyás Sháh, which had successfully ruled over Bengal for more than fifty years, was broken, and that his son became a Muhammadan.

The remark of the Riyáz regarding Shamsuddîn and the probability that he did not belong to the old dynasty, but was an adopted son and was called *Shihábuddîn*, receives a particular importance from the following coins of a new king, whom I shall now assign, for the first time, I believe, a place in the list of the kings of Bengal. Their manner of execution, which follows closely on that of the coins of preceding kings, and the mint towns mentioned proclaim them to be Bengal coins. The name of the new king is—

Shihábuddîn Abul Muzaffar Ba'yazid Sháh.

His coins do not mention the name of his father, and the absence of the usual phrase *ibn ussulṭán*, 'son of the king,' indicates that he was either a usurper, in which case 'Báyazid' might represent the Muhammadan name of Rājah Káns after conversion, or a puppet king, in whose name Rājah Káns reigned and coined in the 'Dárul Islám' of Bengal.

If we take the first alternative, we have against it the clear statement of the historians that Káns remained a Hindú, and also the circumstance

* This is rather early, considering that 752 is Tughluq's last year.

that his son does not mention the name of his father on his coins, which he would scarcely have omitted, if Káns had turned Muhammadan. And if we look upon this Báyzid Sháh as a successful rival of Rájah Káns, we have history and legends against us. Hence the theory of a puppet king—a *bendmí* transaction—is perhaps the least objectionable.

1. *Vide* Pl. VIII, No. 2. Silver. Weight, 163·94 grains. A.H. 812. Circular areas. (Asiatic Society of Bengal, one specimen.)

OBVERSE.—المؤيد بن ابيد الرحمن شهاب الدنيا و الدين ابو المظفر بايزيد شاه السلطان

Margin.—Cut away.

REVERSE.—ناصر امير المؤمنين غوث الاسلام و المسلمين خلد ملكه

Margin.—سرب هذه السكة . . . سنه ٨١٢

Assisted by the assistance of the Merciful, Shihábuddunyá waddín Abul Muzaffar Báyzid Sháh, the king.

The helper of the Commander of the Faithful, the aid of Islám and the Muslims, may God perpetuate his reign! This coin was struck * * * * year 812.

2 *Vide* Pl. VIII, No. 3.* New variety. Silver. Weight, 165·76 grains. Fírúzábád, A. H. 816. (Asiatic Society of Bengal, two specimens.) Rare. The obverse has sixteen convex scollops, and the reverse eight concave ones.

OBVERSE.—As in No. 1.

Margin.—Cut away.

REVERSE.—ناصر امير المؤمنين غوث الاسلام و المسلمين

Margin.—(ابوبكر) ضرب (عمر) فيروز عثمان آباد سنه (علي) ٨١٦

In the *Margin*—(Abú Bakr) struck at ('Umar) Fírúz-(‘Usmán) ábád in the year ('Alí) 816.

Rájah Káns has been identified by Mr. E. V. Westmacott† with Gancsh, Rájah of ‘Dynwaj,’ or Dínajpúr. The Riyaz, who appears to have compiled his chapter on this usurper from local traditions, calls him ‘Rájah of Bhatúriah.’ Whether this name is an ancient one, I cannot say; it does not occur in the *Aín*, nor have I seen it before the time of Rennell’s *Atlas* (1778), in which the name of Bhatúriah is given to a large District east of Máldah, bounded in the west by the Mahanandá River and the Púrna-

* In the figure of this coin, there is a wrong stroke between the *Λ* and *l* in the year.

† *Vide* *Calcutta Review*, No CX, October, 1872. Col. Dalton suggests a comparison of the name ‘Káns’ with ‘Kops,’ or ‘Kõch,’ the same as Kooch (Kooch Bihár). Kooch is often pronounced with a nasal twang, as if it were spelt Kõks.

It is also curious that a Parganah near Dínajpúr (south-west of it) has the name of ‘Bajitpúr,’ a well known Bangálí corruption of Báyzidpúr, which at once reminds us of Báyzid Sháh. We may attach some significance to this, as the name is evidently old; for the name of this very parganah occurs in the *Aín i Akbari* (my text edition, p. 408, in *Sirkár Panjrah*).

bhaha its tributary, in the south by the left bank of the Ganges, in the east by the Karataya, and in the north by Dinájpúr and G'horág'hát. Bhatú-riah, therefore, is the district to both sides of the Atrai River.

The Ṭabaqát i Aḥbari merely states the fact of Kána's usurpation, and assigns him a reign of seven years. Firishtah, who has been followed by Stewart, says that, "though no Muhammadan, he mixed with them and loved them, so much so that some Muhammadans testified to his conversion, and claimed for him a Muhammadan burial. After a vigorous reign of seven years, he went to the world of annihilation, and was succeeded by his son, who had the honor of being converted to Islám."

The Riyáz represents the views of the opponents of the Rájah, and gives the following :—

'When Sultán Shamsuddín died, Rájah Kána, a Hindú zamíndár, seized the whole kingdom of Bengal, and sat proudly on the throne. Oppression and bloodshed followed; he tried to kill all Muhammadans, and had many learned men murdered. In fact, his object was to drive Islám from his kingdom. One day, people say, Shaikh Badr ul Islám, son of Shaikh Mu'inuddín 'Abbás, went to the wicked tyrant, but did not greet him. When the Rájah asked him why he had not saluted him, he replied, "Learned men are not supposed to greet infidels, especially an infidel tyrant, who like thee sheds the blood of Muhammadans." The unclean heretic was silenced, he winced under the reply, and thought of nothing else but to kill the Shaikh. He, therefore, called him one day to a room, the door of which was very low and narrow. But the Shaikh saw through the plan,* and put his foot first over the threshold, and then entered without bending his head. This annoyed the Rájah so much, that he gave orders to take him to the path of his brethren. The Shaikh was at once executed. All the remaining learned men, on the same day, were put on board a ship and were drowned in the middle of the river.

'The usurpation of this infidel and the slaughter of Muhammadans drove at last the Saint Núr Quṭb ul 'Álam to despair, and he wrote a letter to Sultán Ibráhím i Sharqí (of Jaunpúr), *who at that time had extended his kingdom to the [Eastern] frontier of Bihár*,† complaining of the injustice done to Islám and the Muslims, and asking the king to march against the infidel. Ibráhím received the letter with due humility, and consulted with Qází

* The Rájah evidently wished the Shaikh to come to him in a stooping position, which might be looked upon as a 'salám'.

† The Jaunpúr kingdom was founded in 796, and Ibráhím Sharqí, the first titular Sultán, reigned from 804 to 844. The faulty chronology of the Ṭabaqát, Firishtah, and Stewart, makes Rájah Kána die in 794. The story of the Riyáz, therefore, agrees very well with the testimony of coins; but it is strange that the author of the Riyáz did not see the anachronism.

Shihábuddín Jaunpúrí, the chief of the learned of the age, who was allowed at court to sit on a silver chair. The Qazí represented the worldly and religious advantages that would flow from a war with the infidel on the one hand, and from a visit to the great saint, on the other. The king, therefore, collected a large army, invaded Bengal, and pitched his camp at Saráí Fírúzpúr. Rájah Káns now applied to Quṭb ul 'Álam, begged to be forgiven, and asked him to intercede on his behalf with the king of Jaunpúr. The saint replied that at the request of an infidel he could not bid a Muhammadan king stop; in fact, he had himself invited the enemy to come. The Rájah placed his head on the feet of the saint, and said, he was willing to perform anything he ordered him to do, whereupon Quṭb ul 'Álam told him that he would not interfere until he was converted to Islám. The Rájah placed the finger of acceptance upon his eye; but the wife of the infidel led him back to perdition, and he evaded conversion. But he took his boy, who was twelve years old and had the name of Jadú, to the saint and said, "I have got old and wish to renounce the world; make this boy a Muhammadan and give him the kingdom of Bengal." Quṭb ul 'Álam, thereupon, put some *pán* which he was chewing, into Jadú's* mouth, taught him the creed, and thus made him a Muhammadan, giving him the name of Jaláluddín. According to the Rájah's wish, he also sent a proclamation through the town, ordering the people to read the Friday prayer in the name of the new king. The blessed law of the prophet was thus carried out with new vigour. Quṭb ul 'Álam now went to king Ibráhím, and asked him to return. The king looked angrily at Qází Shihábuddín, who said to Quṭb ul 'Álam, "At your request the king has come here, and now you come to him as ambassador to implore his mercy. What shall men think of this?" The saint replied, "When I called you, a tyrant oppressed the faithful; but now, in consequence of your approach, the new ruler has become a Muhammadan; fight with infidels, not with a king that belongs to the Faith." This silenced the Qází; but as the king still looked angry, the Qází had the boldness to enter into a scientific discussion with the saint. After many questions and answers, Quṭb said, "To look on the poor with contempt or entangle them in examinations, brings no man prosperity. Your miserable end is at hand." He then looked even at the Sultán with expressions of anger. Ibráhím now got vexed, and returned with a sorry heart to Jaunpúr. It is said that not long after, Sultán Ibráhím and Qází Shihábuddín died.

When Rájah Káns heard that Sultán Ibráhím was dead, he deposed Jaláluddín, took again the reins of the government into his own hands, and ruled according to his false tenets. He made several hollow cows of gold, threw Jalál into the mouth of one, and pulled him out behind; the gold-

* As saints do with their pupils, or in order to break the boy's caste.

was then distributed among the Brahmans. He hoped that the boy would thus return to his old faith. But as Jalál had been converted to Islám by a saint like Qutb ul 'Álam, he remained faithful to his new belief, and the talk of the infidels made no impression upon him.

'Rájah Káns now again commenced to persecute the Muhammadans. When the measure of his cruelties was full, Shaikh Anwar, son of Qutb ul 'Álam, said one day to his father, "It is a matter of regret that, with you as guardian saint, the Muhammadans have so much to suffer at the hand of this infidel." The saint was just at his devotions, and angry at the interruption, he exclaimed, "The misery will not cease till thy blood is shed." Anwar knew that whatever his father said, was sure to come true; he, therefore, replied that he was a willing martyr * * *. The oppression of Rájah Káns reached the climax, when he imprisoned Shaikh Anwar and his brother's son Shaikh Záhíd. But as he dared not kill them, he banished them to Sunnárgaon, in the hope that they would confess where Qutb ul 'Álam had buried his money and that of his father. But even though they were sent to Sunnargaon, and were much threatened, no money was found, because none had ever been buried, and Shaikh Anwar was ordered to be killed. Before his execution, he said that at such and such a place they would find a large pot. People dug and found a large vessel with only one gold coin in it. On being asked what had become of the other money, Anwar replied, "It seems to have been stolen." Anwar, no doubt, said so by inspiration from the unseen world.

'It is said that on the very day on which Shaikh Anwar died, Rájah Káns went from his palace to the infernal regions. But according to the statement of some, he was killed by his son Jaláluddín, who, though in prison, had won over the officers. The oppressive rule of this monster had lasted seven years.'

X. Jaláluddín Abul Muzaffar Muhammad Sha'h.

According to the histories, he is the son* of Rájah Káns. His real name is given in the Riyáz as 'Jadú,' and by Firishtah as 'Jatmall' or 'Jaimall'—the MSS. differ. There is a place J a t m a l l p ú r, a little east of Dínájpúr, and we may assume the first name to be correct. As the coins of Báýazíd Sháh go up to 816, and the coins of Muhammad Sháh commence with 818, the latter year, or 817, must be the beginning of his reign; and if he reigned for seventeen years, as stated in the histories, his reign may have lasted from 818 to 835, which agrees with the year on Marsden's coin

* Stewart supposes that he was the eldest son of the Rájah by a Muhammadan concubine. According to the *Tabaqát* and *Firishtah*, he reigned seventeen years, and died in 812 A.H. Stewart says, eighteen years.

of his successor Ahmad Sháh (836). General Cunningham tells me that the Bodleian Library at Oxford has a specimen of 831.

1. *Vide* Pl. VIII, No. 4, and Marsden, Numism., Pl. xxxvii, No. dcclxv. Silver. Weight, 166·89 grains. Mint town ? A.H. 818. (As. Soc. Bengal, one specimen.)

Obverse area, bounded by sixteen convex scollops ; reverse area, a four-leaved shamrock.

OBVERSE — جلال الدنيا و الدين ابو المظفر محمد شاه السلطان

Margin, none.

REVERSE.—ناصر الاسلام و المسلمين خلد ملكه

Margin.—ضرب هذه السكة في سنة ٨١٨

Jaláluddunyá waddín Abul Muzaffar Muhammad Sháh, the king. The helper of Islám and of the Muslims,—may his reign be perpetuated ! This coin was struck in . . . in the year 818.

Marsden gives this coin as dated 823, but his figure does not shew that year.

2. *Vide* Pl. VIII, No. 5. New variety. Silver. Weight, 165·695 grains. A. H. 818. (As. Soc. Bengal, one specimen). Obverse area as in No. 1 ; reverse, eight concave scollops.

OBVERSE — السلطان العادل جلال الدنيا والدين ابوالمظفر محمدشاه السلطان

Margin, none.

REVERSE — ناصر امير المؤمنين غوث الاسلام و المسلمين

(ابو بكر) ضرب (عمر) سنة ثمان (عثمان) عشرين (على) ثمانمائة

The just king Jaláluddunyá waddín Abul Muzaffar Muhammad Sháh, the helper of the Commander of the Faithful, the aid of Islám and the Muslims. (Abú Bakr) struck ('Umai) in the year ('Usmán) eighteen ('Alf) eight hundred [818, A. H.].

3. *Vide* Pl. VIII, No. 6. Silver. Weight, 155·725 grains. Sunnár-gáon (?), A. H. 821. (As. Soc. Bengal, one specimen.) Obverse area, as in No. 1 ; reverse area, a square inscribed in a circle.

OBVERSE and REVERSE, as in No. 1.

Margin, ٨٢١ (سنارگاون) ضرب

During the time of Muhammad Sháh, says the Riyáz, the town of Paṇḍuah became so flourishing, that it cannot be sufficiently described. The king also built a mosque, a reservoir, the Jaláli Tank, and a Sarái in Gaur ; in fact, Gaur also was again during his reign occupied. He reigned for seventeen years. In the year 812 [822], he made the Palace of Gaur his residence. A large dome with his tomb still exists in Paṇḍuah, and the tombs of his wife and his son are at the side of his in the same vault.

XI. Shamsuddīn Abul Muja'hid Ahmad Shāh.

Marsden (Numismata, Pl. XXXVII, No. DCCCLXXIV) has published a silver coin of this king, whom the histories call the son of Muhammad Shāh. The coin bears the clear date 836 A.H. (1432-33, A.D.), and differs from the preceding Bengal coins by having the Kalimah on one side.* The *Tabaqat* merely states that he reigned for sixteen† years, and died in 830 A. H., whilst *Firishtah* adds that he was a good and liberal king. The *Riyāz* gives him a different character. 'As Ahmad Shāh was of rough disposition, tyrannical, and blood thirsty, he shed the blood of innocent people, and tore open the bodies of pregnant women. When his cruelty had risen high, and great and small were in despair, Shādi Khān and Nāçir Khān, two of his slaves, whom he had raised to the rank of Amirs, made a conspiracy and killed him. This took place in 830, after Ahmad Shāh had reigned sixteen, or, as some say, eighteen, years.'

• 'Shādi Khān now desired to get rid of Nāçir Khān; but Nāçir Khān outwitted him, killed him, and issued orders as king. The Amirs and Maliks, however, refused to obey him, and murdered him, after seven days, or, as some say, after twelve hours.'

* With Ahmad Shah ends the dynasty of Rājah Kāns. Taking the year 817, the beginning of Muhammad Shāh's reign, as a well attested starting point, and assuming the duration of each reign as given in the histories to be correct, we would get—

	<i>Duration of reign.</i>	<i>Ascertained dates.</i>
Rājah Kāns (Bāyazid Shāh)	} 817 — 7, or 810 to 817.	Coins of 812 and 816.
Muhammad Shāh,		
Ahmad Shāh,		
	817 + 17, or 817 to 834.	Coins of 818, 821, 823, 831.
	834 + 16, or 834 to 850.	Coin of 836.

Now above we saw that the last ascertained year for Hamzah Shāh's reign is 804. If we then allow, on the testimony of all histories, above three years to Shamsuddīn, son, of Saifuddīn, we would be brought to the year 808, the commencement of the usurpation of Rājah Kāns, and the reckoning, according to the data which we at present possess, is on the whole satisfactory.

The length of Ahmad Shāh's reign only is open to doubt; for if his reign be extended to 850, we are forced to assume that for the greater part of his rule he was vigorously and successfully opposed by Nāçiruddīn Mahmūd, whose coinage, as will be seen from the following, goes back at least to 846 A. H.

* The reading of the obverse is—

السلطان الاعظم شمس الدين ابو الجهاد احمد شاه بن محمد شاه السلطان

† Stewart has eighteen.

RESTORATION OF THE ILYA'S SHA'H DYNASTY.

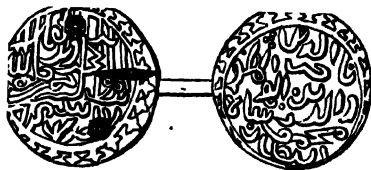
XII. Na'siruddi'n Abul Muzaffar Mahmúd Sha'h (I).

The histories agree in describing him as a descendant of Ilyás Sháh. He seems to have been supported by the old party who were tired of Ahmad Sháh; old families are said to have gathered round him; and Gaur, the old capital, was rebuilt by him. The wars between Jaunpúr and Dihlí, as Firishtah correctly observes, gave Bengal rest, and Mahmúd Sháh, according to the histories, reigned in peace for thirty-two years, or according to some "not more than twenty-seven years," and died in A. H. 862.

In the histories, he is called by his first name Náçir Sháh, instead of Mahmúd Sháh. Bengal history presents several examples of similar inversions, if the retention of the familiar name of the king can be called so.

The chronology of Mahmúd Sháh's reign has been considerably cleared up by a coin in the possession of Col H. Hyde, the President of our Society, and by the inscriptions received from General Cunningham and Dr. Wise. The dates now ascertained are 846; 861; 20th Sha'bán, 863; 28th Zil Hajjah, 863. Again, the oldest inscription of Bárbak Sháh, discovered by Mr. E. V. Westmacott, is dated Çafar, 865. We are, therefore, certain that Mahmúd Sháh must have reigned at least till the beginning of 864. But if the second statement of the histories regarding the length of his reign (27 years) be correct, we would get the year 836 as the first year of his reign, the very year in which Marsden's Ahmad Sháhí was struck. This would make Mahmúd Sháh an opposition king for the whole length of Ahmad Sháh's reign, which the histories say was not the case. We require, therefore, more evidence to fix the beginning of Mahmúd's reign.

1. *Coin of Mahmúd Sháh.* New variety. Silver. Weight, 165·08 grains. (Col. H. Hyde.) A. H. 846. No mint-town. The margin contains little crosses.



OBVERSE.—مؤيد بتأييد الرحمن حجت خليفة الله [في الزمان؟] ضرب سنة ٨٤٦

REVERSE.—ناصر الدنيا والدين ابوالمظفر محمود شاه السلطان

He who is assisted by the assistance of God, the evidence of the Khalifah of God in this age, Náçiruddunyá waddín Abul Muzaffar Mahmúd Sháh, the king. A. H. 846.

Mahmúd Sháh's coins hitherto published are almost valueless. The cabinet of the Asiatic Society has only one specimen, without date or mint-

town, like No. 8 of Laidley's Plate of Bengal coins (Journal XV, for 1846, Pl. iv). Some have the Muhammadan creed on one side in (so called) Tughrá characters, and, on the other side, the name of the king *Náqirud-dunyá vaddín Abul Muzaḥfar Mahmúd Sháh*. The margin of the specimen is unfortunately cut away. Mr. Laidley's No. 7 has the same obverse; the reverse is the same as on Hamzah Sháh's coins—*

ناصر امير المؤمنين غوث الاسلام و المسلمين خلد ملكه

But the three inscriptions of this king are very valuable, viz., one from Sātgaon, dated A. H. 861, or 1457 A. D.; one from Dháká, dated 20th Sha'bán, 863, or 13th June, 1459;† and one from Gaur, discovered by General Cunningham, dated 28th Zil Hijjah, 863, or 26th October, 1459.

No. 9. *The Mahmúd Sháh Inscription of Sātgaon* (A. H. 861).‡

قال الله تعالى انما يعمر مساجد الله من آمن بالله و اليوم الآخر و اقام الصلوة و اتى الزكوة و لم يخش الا الله فعسى اولئك ان يكونوا من المهتدين و قال عز من قائل جل جلاله و عم نواله ان المساجد لله فلا تدعوا مع الله احدا و قال النبي صلى الله عليه و سلم و على آله و اصحابه من بنى مسجدا لله بنى الله له بيتا فى الجنة * * * * * المؤيد بتايد [الرحمن] * * * * * بالحجة و البرهان غوث الاسلام و المسلمين ناصر الدنيا و الدين ابو المظفر [محمود] د شاه السلطان خلد ملكه و سلطانه و اعلى امرة و شانه بناء النجان الاعظم المعظم المكرم المخاطب بخطاب

* I am doubtful whether Laidley's Nos. 11 and 12 belong to this king. The obverse of No. 11 consists of seven circles, four with 'Náqir Sháh,' and three with 'assultán,' the reverse is illegible. It is unlikely that the king should have called himself Náqir Sháh on some coins, when other coins and all inscriptions give his royal name 'Mahmúd Sháh.' Laidley's No. 12 is curious; it shews on the reverse the *kalimah* in clumsy Kufic characters, and on the obverse five circles with 'Mahmúd Sháh assultán.' In the centre of the piece are three rings, thus—°.°. Three rings thus arranged are Timur's arms; vide Vambéry's Bokhara, p. 205.

† Received from Dr. J. Wise. It was published in Journal, As. Soc. Bengal, 1872, Part I, p. 108.

‡ This inscription was first published by me in Journal, As. Soc. Bengal, for 1870, Part I, p. 293, where notes will be found on the locality. The name 'Mahmúd' is broken away, only the *dál* is left, which in 1870, when I copied the inscription from the stone, I mistook for a *nén*. General Cunningham's rubbing leaves no doubt that it is a *dál*. I therefore republish the inscription with this important correction.

توبیت خان سلمہ اللہ تعالیٰ من آفات آخر الزمان بمنہ و کمال کرمہ فی
سنة الحادی و ستین و ثمانمائة ۱۱

God Almighty says, 'Surely he builds the mosques of God, who believes in God and the last day, and establishes the prayer, and offers the legal alms, and fears no one except God. It is they that perhaps belong to such as are guided. And how beautifully does He whose glory shines forth and whose benefits are general, say, 'Surely the mosques belong to God, do not call on any other besides Allah.' And the Prophet says,—may God's blessing rest upon him and upon his house and his companions!—'He who builds a mosque for God, will have a house built for him by God in Paradise.'

* * * * by him who is assisted by the help of the Merciful, * * * by proof and evidence, the help of Islam and the Muslims, Nāḡiuddunyā waddīn Abul Muzaffar [Mahmūd] Shah, the king,—may God perpetuate his kingdom and his rule and elevate his condition! It was built by the great Khan, the exalted, the liberal, who has the title of Tarbiyat Khan—may God Almighty protect him from the evils of the end of time by His grace and the perfection of His mercy! In the year 861. [A D 1457]

No. 10. *The Mahmūd Shāh Inscription of Hazrat Panduah*, (Pl. V,
No 4)

General Cunningham found this inscription at the Chhotā Dargāh in Panduah.

قال الله تعالى كل نفس ذائقة الموت و قال الله تعالى اذ جاء اجلهم
فلا يستأخرون ساعة ولا يستقدمون * قال الله تعالى كل من عايها فان
و يبقى وجه ربك ذو الجلال و الاكرام * و انتقل محمدمنا العلامة استدان
الائمة برهان الامة شمس الملة حجة الاسلام و المسلمين نافع الفقراء و المساكين
مرشد الواصلين و المسترشدين من دار العناء الى دار البقاء القامن و العسرين
من ذى الحجة مى يوم الاثنين و كان ذلك من السنة الثامن و الستين
و ثمانمائة فى عهد سلطان السلاطين حامى بلاد اهل اسلام و المسلمين
ناصر الدنيا و الدين ابرالمظفر محمود شاه سلطان صانه الله بالامن و الامان
و بنى هذا الروضة خان الاعظم لطيف خان سلمه من البليات و آفات ۱۱

God Almighty says, 'Every creature tasteth death' (Qor., III, 182). He also says, 'When their fate comes, they cannot delay it an hour, nor anticipate it' (Qor., X, 60). He also says, 'Everything on earth fadeth, but the face of Thy Lord remaineth full of glory and honor.'

Our revered master, the teacher of Imáms, the proof of the congregation, the sun of the Faith, the testimony of Islám and of the Muslims, who bestowed advantages upon the poor and the indigent, the guide of saints and of such as wish to be guided, passed away from this transient world to the everlasting mansion, on the 28th Zil Híjjah, a Monday, of the year 863, during the reign of the king of kings, the protector of the countries of the Faithful, Náqiruddunyá waddín Abul Muzaffar Mahmúd Sháh, the king,—may God keep him in safety and security! This tomb was erected by the great Khán, Latíf Khán,—may God protect him against evils and misfortunes!

XIII. Ruknuddín Abul Muja'hid Bárbak Sháh.

The histories agree in calling him the son of Náqir Sháh, i. e., Mahmúd Sháh, and in assigning him a reign of seventeen years. The Riyáz says, seventeen, *or sixteen*; and the latter statement is evidently nearer the truth, as by the preceding inscription Bárbak cannot have commenced to reign before 864.

To judge from the Tribení inscription published by me in this Journal for 1870, p. 290, it would appear that Bárbak as prince was governor of south-western Bengal in 860; but the inscription styles him 'Malik,' not 'Sultán,' from which it is clear that he was no rebel.

The following inscription, which Mr. E. V. Westmacott found in Dínájpúr, is very valuable, as it proves that Bárbak was king in the very beginning of 865.

No. 11. *The Bárbak Sháh Inscription of Dínájpúr.*

بسم الله الرحمن الرحيم • نصر من الله وفتح قريب و بشر المؤمنين •
 فالله خير حافظا و هو ارحم الراحمين •
 بئذ المسجد فى العهد السلطان ابن سلطان ركن الدنيا و الدين ابو
 المعجده باربكشاه سلطان ابن محمود شاه سلطان خلد الله ملته و سلطانه
 بحكم اشارة خان اعظم و خاتان معظم بهلوى العصر و الزمان ألغ اقرار (؟)
 خان سرلشكرو وزير بانى خير مسجد مذکور و مرمت كرد و روضه خان اعظم
 و خاتان معظم ألغ نصرت خان جنگدار و شقदार معاملات جور و برور
 و مكلمها ديگر فى التاريخ السادس و عشر من الشهر الصفر ختمه الله
 بالخير و الظفر شهر سنة خمس و ستين و ثمانماية ١١

In the name of God the merciful and the clement! A victory from God and a near success, and announce it to the Faithful (Qor. LXI, 18). God is excellent as a protector, and He is the most merciful of the merciful (Qor. XII, 64).

The building of this mosque (took place) in the reign of the king, the son of a king, BUKNUDDUNYÁ WADDÍN ABUL MUJÁHID BÁRBAK SHÁH, the king, son of MAHMÚD SHÁH, the king,—may God continue his kingdom and rule!—by the direction of the great Khán, the noble chief, the hero of the age and the period, ULUGH IQRÁR (?) KHÁN, commander and wazír, builder of this religious edifice, the said mosque. And the repairer of the tomb (is) the great Khán and noble chief ULUGH NUQRAT KHÁN, the jangdár and shiqdár of the affairs of Jor and BARÚR and of other Mahallahs. Dated, the 16th day of the month of Safar,—may God bring it to a happy and successful end!—of the year 865. (1st December, 1460, A. D.)*

Note on a Bárbak Sháh Inscription from Dindjúpúr.—By E. VESEY WESTMACOTT, Esq., C. S.

'I send a rubbing of an inscription of the reign of Barbak Shah, A. H. 865. It states him to have been the son of Mahmood Shah, a point upon which a bit of additional evidence is not without value. It is very clearly cut on the usual black stone, which is commonly called basalt, but which is more like a slate. In one place I found the surface flaking off, and so brittle, that I was afraid to clear it of the whitewash, with which it was clogged, as thoroughly as I should have liked. The slab is about twenty-two inches by ten, and the inscription is in five lines.

'It is let into the eastern front of a little brick-built mosque adjoining the grave of Chihil Ghazee, the Peer, mentioned by Dr. Buchanan in his report on Dinagapore, p. 29. The grave, surrounded by an iron railing, is 54 feet long, and is supposed to correspond to the stature of the saint. It is on the north side of the path up to the mosque, some hundred yards to the west of the Darjeeling road, four miles north of Dinagapore, and not far from the Gopalgunge temples. The Mootawallee is a very ignorant fellow, and I have found out nothing of the Peer beyond his name.

'The founder of the mosque was "Shikdár of the affairs of Baroor," and of another place. Baroor I take to be the parganah of that name, now in Poorniah, outside the western border of Dinagapore.

'On each side of the inscription has been let into the wall a stud, or circular piece, of the same stone, which have on the right side of each a groove, as if for a clamp, which makes me think they were not originally cut for their present position. They are about eight inches in diameter. The centre of each bears in Tughra the *muhr i nubuwwat* or 'seal of prophethood,' surrounding this is an inscription of which I send rubbings, but which neither the Moulawi nor I can decipher. In an outer ring, half an inch lower, the northern stone bears the inscription—

* I take this opportunity to correct the wrong reading of a title in the Bárbak Sháh Inscription published by me in this Journal, for 1870, Pt. I., p. 290, Inscr. VII., where for *جامدار عزوجل* I should have read *جامدار غيرمحملي* *jámaddár i ghair-i mahallí*, as explained in Journal for 1873, Pt. I., p. 106.

این نقشه مهر نبوت که در میان دو شانه مبارک محمد مصطفی ملى
الله عليه و سلم بود ۱۱

This is the picture of the seal of prophetship which was between the two shoulders of Muhammad Muṣṭafá—may God bless him!

‘As door steps to the mosque and to the enclosure surrounding the grave are pieces of hewn stone, similar pieces lying close by; they are more or less carved and appear to be parts of doorways. Such stones are common in all parts of the district, and are said by tradition to have been brought from Bannagar, near Debkot. They are similar to the remains of Gour and Poroowa [Paṇḍuah]. On the south side of the path is the female portion of a *ling*, of large size, a queer ornament for the premises of a Mahomedan saint.

‘The mosque is somewhat ruinous, the roots of plants are tearing it in pieces. I think that it is of greater antiquity than most in the district, from the strength of the brick arches, the workmanship of the dome, and the fact that the hewn stones which are built into the inner side of each archway, have been cut to fit their places, although bearing marks of clamps to show they have been taken from another building.

‘Three archways, twenty-eight inches wide and nearly six feet high, lead into a vestibule twelve feet by five and a half, at each end of which a similar archway opens to the north and south. Three more archways lead into a chamber, twelve feet square, surmounted by a dome, now cracked in several directions. In the west wall are three niches, and two small archways on the north and south lead into the open air. On the inner side of each of the ten archways, a little below the spiring of the arches, hewn stones, six or eight inches thick, are carried through the whole thickness of the wall which is three feet through. It is unusual in Dinagepore to find that the workmen have dressed the stone as they have here.

‘It is usual to build them in just as they are, often with most incongruous Hindoo carvings upon them.’

Regarding the “seal of prophetship,” it is said in the *Madárij-unnabuwwat* by ‘Abdul Haq of Dihlí, that the seal between the shoulders of the Prophet was a thing raised above the surrounding parts of his blessed body, resembling the body in colour, smoothness, and brightness. And it is stated in the *Mustadrík* that Wabí ibn Munabbih said that no prophet was sent on earth that had not the sign of prophetship on his right hand, except the Prophet, who had the sign between the shoulders. Shaikh Ibn Hajar in his commentary to the *Mishkát* says that the seal contained the words *والله وحده لا شريك له توجع* *توجع كنهى فانك منصور*, “and God is one, He has no associate; pay attention wherever thou art, for thou art victorious.”

Some traditions say that the seal was of light, and others, that it vanished from the skin when the Prophet expired, so much so that people knew by its disappearance that the prophet was really dead. Several authorities compare the seal to the egg of a pigeon: some call it a *غدة حمراء*, 'a red fleshknot,' and others say that it was a wart covered with hair.

Marsden gives a Bárbak coin which clearly shews the year 878.* The cabinet of the Asiatic Society of Bengal contains the following:—

1. *Vide* Pl. IX, No. 7. New variety. Silver. Weight 164·025 grains. (Asiatic Society's Cabinet.) A specimen in the possession of Bábu Rájendralála Mitra weighs 164·335 grains.

OBVERSE.—*** لا إله إلا الله محمد رسول الله السلطان العالم العادل

REVERSE.—••• الاعظم المعظم باريكشاه السلطان بن محمود شاه السلطان

Neither of these coins give Bárbak's full name.

XIV. Shamsuddi'n Abul Muzaffar Yu'suf Sha'h, son of Bárbak Sháh.

Firishtah represents him as a learned man, who, after his accession charged the 'Ulamá to see the law of the Prophet carried out. 'No one dared drink wine.'

The histories assign him a reign of seven years and six months, and say that he died in 887. If so, the end of his reign was marked by a successful rebellion of his uncle Fath Sháh; but it is just as likely that Yúsuf died early in 886.

Marsden has a coin of this king without year, and Laidley gives a new variety of 884.† General Cunningham's inscriptions give the following dates—

1. Panduah, 1st Muharram, 882, or 15th April, 1477.
2. Hazrat Panduah, 20th Rajab, 884, or 8th October, 1479.
3. Gaur, 10th Ramazán, 885, or 13th November, 1480.

No. 12. *The Yúsuf Sháh Inscription of Panduah, Huglí District.*‡

(Pl. VI, No. 1.) A. H. 882.

قال الله تعالى ان المساجد لله فلا تدعوا مع الله احدا وقال عليه السلام
من بنى مسجدا في الدنيا بنى الله له في الآخرة سبعين قصرا • بنى
المسجد ني عهد السلطان الزمان المويّد بتأييد الديّان خليفة الله بالحجة

* *Vide* also Journal, As. Soc. Bengal, 1870, Part I., p. 299, note.

† Bábu Rájendralála Mitra has a specimen (like Laidley's) of 883 *خزانة*. The margin, similarly to Fath Sháh's coins, contains shamrocks separated by dots. Weight 163·65 grains.

‡ *Vide*, Journal, As. Socy., Bengal, 1870, Pt. I., p. 300.

و البرهان السلطان ابن السلطان ابن السلطان شمس الدنيا و الدين
ابوالمظفر يوسف شاه السلطان ابن باربكشاه السلطان ابن محمود شاه
السلطان خلد الله ملكه و سلطانه بني هذا المسجد المجاهد المجاهد
مجلس معظم المكرم صاحب السيف و القلم يهوى العصر و الزمان الخ
مجلس اعظم سلمه الله تعالى في الدارين مؤرخا في اليوم الرابع القرة
من شهر محرم سنة اثنى و ثمانين و ثمانماية و تم بالخير !!

God Almighty says—"Surely the mosques belong to God. Do not call on any one besides Allah. And he upon whom God's blessing rest, says, 'He who builds a mosque in the world, will have seventy castles built for him by God in the next world.' This mosque was built during the reign of the king of the age, who is assisted by the assistance of the Supreme Judge, the viceregent of God by proof and evidence, the king, the son of a king who was the son of a king, Shamsuddunyá waddín Abul Muzaffar Yúsuf Sháh, the king, son of Bárbak Sháh, the king, son of Mahmúd Sháh, the king—may God perpetuate his kingdom and rule! The mosque was built by the Majlis ul Majális, the great and liberal Majlis, the lord of the sword and the pen, the hero of the age and the period, Ulugh Majlis i A'zam—may God Almighty protect him in both worlds!

Dated Wednesday, 1st Muharram, 882. Let it end well!

No. 13. *The Yúsuf Sháh Inscription of Hazrat Panđuah.* A.H. 885.

قال النبى صلى الله عليه و سلم من بني معجدا لله بني الله له قصر
في الجنة * بنى هذا المسجد فى زمن السلطان العادل البادل شمس
الدنيا و الدين ابوالمظفر يوسف شاه السلطان بن باربك شاه السلطان بن
محمود شاه السلطان خلد الله ملكه و سلطانه مجلس المجاهد مجلس
اعلى اعلاه الله تعالى شانه فى الدارين و كان ذلك فى التاريخ هجرة
النبى صلى الله عليه و سلم فى يوم الجمعة عشرين شهر رجب رجب قدرة
سنة اربع و ثمانين و ثمانماية !!

The Prophet (may God's blessing rest upon him!) says, 'He who builds a mosque for God, shall have a castle built for him by God in Paradise.' This mosque was built in the reign of the just and liberal king Shamsuddunyá waddín Abul Muzaffar Yúsuf Sháh, the king, son of Bárbak Sháh, the king, son of Mahmúd Sháh, the king,—may God perpetuate his kingdom and rule!—by the Majlis ul Majális, the exalted Majlis,—may God whose dignity is exalted also exalt him in both worlds! And this took place on Friday, the 20th Rajab (may the dignity of the month increase!) of the year 884, according to the era of the flight of the Prophet, upon whom God's blessing rest!

No. 14. *The Yúsf Sháh Inscription of Gaur. A.H. 885.*

قال النبي صلى الله عليه و سلم من بنى مسجدا لله بنى الله
تعالى له سبعين قصرا في الجنة * بنى هذا المسجد في عهد السلطان
ابن السلطان بن السلطان باريك شاه السلطان بن محمود شاه السلطان *
بنى هذا المسجد خان اعظم و خاقان معظم * * بتاريخ دهم ماه مبارك
رمضان سنة خمس و ثمانين و ثمانماية ||

The Prophet, &c. &c., [as before]. This mosque was built in the reign of the king, the son of a king who was the son of a king, Shamsuddunyá waddín Abul Muzaffar Yúsf Sháh, the king, son of Bárbak Sháh, the king, son of Mahmúd Sháh, the king. The mosque was built by the great Khán, the exalted Kháqán, * * * * [not legible.]

Dated, the 10th day of the blessed month of Ramazán, 885.

A rubbing of another Yúsf Sháhi Inscription has been received from Dr. J. Wise. Dr. Wise says—"The inscription is from one of the four mosques which surround the tomb of Sháh Jalál at Silhat. It is a fine *Tughrá* inscription, but unfortunately one-third of it has been built into the masonry, the slab forming the lintel of the door!"

The inscription is—

No. 15. *The Yúsf Sháh Inscription of Silhat.*

*** ابو المظفر يوسف شاه ابن باريك شاه السلطان ابن محمود شاه
السلطان خلد الله ملكه و سلطانه و باني هذا المسجد المجلس الاعظم
المعظم الدستور الساعي في الخيرات و المبررات المجلس الاعلي حفظ الله
تعالى عن الآفات ***

*** Abul Muzaffar Yúsf Sháh, son of Bárbak Sháh, the king, son of Mahmúd Sháh, the king—may God perpetuate his rule and kingdom! And the builder is the great and exalted Majlis, the wazír (*dastúr*), who exerts himself in good deeds and pious acts, the Majlis i A'la—may God preserve him against the evils and * *

To judge from Dr. Wise's rubbing, the inscription, in point of beauty, ranges immediately after the Sikandar Sháh inscription No. 8, mentioned above, and it would be well, if the *Sar i qaum*, 'the head of the clan,' as the Mutawallí of the tomb is called, would take steps to have this beautiful inscription taken out of the masonry, and thus restore it to light and history.

Dr. Wise has also sent the following interesting note on Sháh Jalál.

Note on Sháh Jalál, the patron saint of Silhat.—By DR. J. WISE,
ДИА'КА.

The following abridgment of the life and miraculous adventures of Sháh Jalál, the conqueror of Silhat in the 14th century, is taken from the *Suhail-i-Yaman*, written by Náçiruddín, late Munçif of Silhat; his work was composed in the year 1859. It is an abstract of two earlier histories, one of which is called the "*Risálah of Muhi-uddín Khádim*;" the other, by an unknown author, is designated the "*Rauzatus-Salátn*."

According to the Munçif, Sháh Jalál Mujarrid Yamaní was the son of a distinguished saint, whose title of Shaikhush-Shuyúkh is still preserved. He belonged to the Quraish tribe. Sháh Jalál's father was named Muhammad; his grandfather Muhammad Ibráhim. His mother was a Sayyidah. She died within three months of the birth of this her only son. His father died fighting in a *jihád* against the infidels.

The youth was adopted by his maternal uncle Sayyid Ahmad Kabír Suhrwardí, a Darwish of no mean accomplishments, who had studied under the renowned Sháh Jalál ud-din Bukhárí.

For thirty years Sháh Jalál is said to have lived in a cave without crossing the threshold. He was at last summoned from his seclusion by his uncle, owing to the following circumstance. One day seated in front of his house at Makkah, lost in contemplation, Sayyid Ahmad saw a doe big with young approach him. The doe related how a lion had appeared in the wood in which she lived, and was killing all her comrades. She finally requested him to come and drive away the brute. Sháh Jalál was called forth from his cave, and directed to go and turn out the lion. On the way he puzzled himself what was to be done when the lion was seen. Unexpectedly, however, he met the animal, and the lustre which shot from his eye was so dazzling, that the lion fled and was heard of no more.

On his return, Sayyid Ahmad was so pleased with his behaviour, that he gave him a handful of earth and told him to go forth and wander over the world, until he found earth of similar colour and smell. Where he did, he was there to make his abode.

Hindústán was then the land to which adventurers directed their steps, and Sháh Jalál followed their example. He passed by a city of Yaman, the king of which was informed that a great Darwish was near. He accordingly sent a cup of deadly poison instead of sharbat, to test his power. Sháh Jalál at once divined its nature, and informed the king's messengers that the instant the draught was swallowed, the king would die. The poison was quaffed without injury to the saint, but, as foretold, the king died.

Sháh Jalál proceeded on his course, but four days afterwards he was overtaken by the Sháhzádah, who had determined on leaving his kingdom and on following the saint in his wanderings.

After journeying for many days, they arrived at Dihlí, where the celebrated Nizám-uddín Auliya then resided. When Sháh Jalál entered the city, Nizám-uddín was sensible of the arrival of a saint. He, therefore, sent messengers to search for him and to invite him to come and eat with him. Shah Jalál accepted the invitation and gave the messengers a bottle filled with cotton, in the centre of which he placed a live coal. The receipt of this wonderful bottle satisfied Nizám-uddín that this was no common Darwish. He accordingly treated him with every honour, and on his departure he gave him a pair of black pigeons.

The narrative is now transferred to Silhaṭ. In a Malallah of that city, called Tol-takar, resided at this period Shaikh Burhán-uddín. How a Muhammadan got there, or what he was doing so far away from his own countrymen, puzzles Muhi-uddín, who thinks that this solitary believer must have belonged to some Hindú family, and that he could not have been a true Muhammadan. Burhán, the story goes, had made a vow, that if he was blessed with a son, he would sacrifice a cow. A son being born, he performed his vow; but as bad luck would have it, a kite carried off a portion of the flesh and dropped it in the house of a Brahman. The incensed Brahman went to Gaur Gobind, the king of Silhaṭ, and complained. The king sent for Burhán and the child; and on the former confessing that he had killed a cow, the child was ordered to be put to death, and the right hand of the father cut off.

Burhán-uddín left Silhaṭ and proceeded to the court of Gaur. The king on hearing of what had occurred, ordered his nephew (*bhánjá*) Sultán Sikandar, to march at once towards the Brahmaputra and Sunnargáon with an army.

When news reached Silhaṭ that an army was approaching, Gaur Gobind, who was a powerful magician, assembled a host of devils and sent them against the invaders. In the battle that ensued, the Muhammadans were routed, and Sultán Sikandar with Burhán-uddín fled. The Prince wrote to his uncle, informing him of the defeat and of the difficulties met with in waging war against such foes. The monarch on receiving the news, gathered together the astrologers, and conjurers, and ordered them to prophesy what success would attend a new campaign. Their reply was encouraging, and Naṣir-uddín Sipahsálár was directed to march with a force to the assistance of Sultán Sikandar. This re-inforcement, however, did not restore courage to the Muhammadan soldiery, and it was decided to consult with Sháh Jalál, who with 360 Darwishes was waging war on his own account with the infidels. The Sultán and Naṣiruddín proceeded to the camp of the saints,

where the Sháh encouraged them by repeating a certain prayer, and promised to join their army and annihilate the hitherto victorious army of devils. Along with the Sháh were Sayyid Muhammad Kabír, Sayyid Háji Ahmad Sání, Shaikh Abul Muzaffar, Qázi Amínuddín Muhammad, Sháhzádah Yamání, &c., &c.

The advance of this army of saints was irresistible. The devils could not prevail against them, and Gaur Gobind, driven from one position to another, at last sought refuge in a seven-storied temple in Silhat, which had been built by magic. The invaders encompassed this temple, and Sháh Jalál prayed all day long. His prayers were so effective, that each day one of the stories fell in, and, on the fourth day, Gaur Gobind yielded on the promise of being allowed to leave the country.

The terms agreed to, Gaur Gobind retired to the mountains (*kohistán*). While at his protracted prayers, Sháh Jalál discovered that the earth on which he was kneeling was of the same colour and smell as that given him by the Makkah Darwísh. He, therefore, determined on establishing his abode there. With him remained Sháhzádah Yamání, Háji Yúsuf, and Háji Khalíl. The rest of the saints retired with the army.

The remainder of Sháh Jalál's life was spent in devotion and in miraculous actions which still live in the traditions of the people. It is believed that Sháh Jalál never looked on the face of woman. One day, however, standing on the bank of a stream, he saw one bathing. In his simplicity, he asked what strange creature it was. On being informed, he was enraged, and prayed that the water might rise and drown her. He had no sooner expressed this wish than the water rose and drowned her. Other less questionable actions are related regarding him. For instance, he caused the corpse of Naçir-uddín Sipahsálár, who died at Silhat, to disappear from a Mosque, while the friends were mourning over it. On another occasion he wished that a fountain like the holy Zamzam of Makkah might spring up near his abode, and immediately the fountain appeared.

Sháh Jalál was translated (*intigál*) the 20th of the "Kali Chand," A. H., 591, in the 62nd year of his age.

Dr. Wise also writes—"It is a curious fact that the Sháh is invoked by the Silhat *gánjah* (hemp) smokers. I have got a Silhat lunatic, who every day before smoking his *chillum* of tobacco invokes the saint in the following manner :—

*Ho ! Bisheshwar Lál,
Tin lál'h Pír Sháh Jalál,
Ek bár, dubára, Jagannath ji ká piyára
Kháne ká dúkh bhát, bajáne ko dotára.*

The chronology of the 'Life of Sháh Jalál,' as Dr. Wise observes, is confused. His death is put down as having occurred in 591, A.H., and he said to have visited Nizámuddín Auliá, who died in 725, A. H. Again, according to the legends still preserved in Silhaṭ, the district was wrested from Gaur Govind, the last king of Silhaṭ, by king Shamsuddín in 1384 A. D., or 786 A. H., during the reign of Sikandar Sháh, whilst 'king Shamsuddín' can only refer to Shamsuddín Ilyás Sháh, Sikandar's father.

Dr. Wise also draws attention to the statement made by Ibn Baṭúṭah who "from Sadkáwán [Chátgáon] travelled for the mountains of Kámrú [Kámrúp, western Ásám]. * * His object in visiting these mountains was to meet one of the saints, namely, Shaikh Jalál uddín of Tabriz."* Jalál then gives him a garment for another saint 'Burhán uddín,' whom Ibn Baṭúṭah visits in Khánbálík (Pekin). Ibn Baṭúṭah, as remarked above, was in Eastern Bengal, when Fakhruddín was king (739 to 750, A. H.). But here again the confusion of dates and names is very great. Jalál uddín of Tabriz died, as we saw above, in 642, and the Silhaṭ Jalál is represented as a man from Yaman.† Neither Jalál nor Burhánuddín is mentioned in the biographical works of Muhammadan Saints.

XV. Sikandar Sha'h II.

The Riyáz says that this king was the son of Yúsuf Sháh; the other histories say nothing regarding his relationship. Stewart calls him "a youth of the royal family," but afterwards calls Fath Sháh his "uncle." The Riyáz says that he was deposed on the same day on which he was raised to the throne; the Áin i Akbarí gives him half a day; my MS. of the *Ṭabaqát*, two and a half days; Firishtah mentions no time; and Stewart gives him two months.

XVI. Jalaluddín Abul Muzaffar Fath Sha'h, son of Mahmúd Sháh.

Fath Sháh was raised to the throne, as "Sikandar Sháh did not possess the necessary qualifications." The histories say that his reign lasted from 887 to 896, A. H., and yet, they only give him seven years and five months (Stewart, seven years and six months). The inscriptions and coins, however, given below shew that he reigned in 886; and if the "seven years and five months" are correct, Fath Sháh could only have reigned till 892 or 893, which agrees with the fact that his successor Firúz Sháh II. issued coins in 893. Fath Sháh was murdered at the instigation of the Eunuch Bárbak.

Laidley has published two silver coins of this king, of which one seems to have been struck at Fathábád in 892. The following is a new variety.‡

* Lee, Ibn Baṭúṭah, p. 195.

† Vide the Silhaṭ Inscription of 1505, given below under Husain Sháh.

‡ The coin given by Marsden as a Fath Sháhí does not belong to this king.

1. *Vide* Pl. IX, No. 8. Silver. Weight, 158·65 grains. *Fathábád*, A. H. 886. (As. Soc. of Bengal, one specimen.) Circular areas. The margin consists of ornamental designs, resembling the niches in mosques and rosettes.

OVERSE.—جلال الدنيا والدين ابوالمظفر فتحشاه سلطان

REVERSE.—ابن محمود شاه السلطان مجده الله الفتح فتحاباد ٨٨٦

Jaláluddunyá waddín Abul Muzaffar Fath Sháh Sultán, son of Mahmúd Sháh, the king—may God strengthen him with victory! *Fathábád*, 886.

The following five inscriptions of this king have been received by the Society—

1. *Dháká*, 1st Zil Qa'dah, 886, or 2nd January, 1482.
2. *Dhámraí*, 10th Jumáda I., 887, or 27th June, 1482. Published, J. A. S. B., 1872, p. 109.
3. *Bikrampur*, middle of Rajab, 888, or August, 1483.
4. *Sunnárgáon*, Muharram, 889, or beginning of A. D. 1484.
5. *Sátgáon*, 4th Muharram, 892, or 1st January, 1487. Published, J. A. S. B., Pt. I, 1870, p. 294.

No. 16. *The Fath Sháh Inscription of Bandar, near Dháká.*

A. H. 886. (Pl. VII, No. 1.)

The Society is indebted to Dr. J. Wise for this important inscription, regarding which he writes as follows—"The inscription was found on an old Masjid at Bandar, on the banks of a K'hál called Tribení, opposite Khizrúr (Dháká). This K'hál was in former days the junction of the Brahmaputra, Lak'hya, and Ganges. At its opening on the left bank of the Lak'hya, a fort still stands, said to have been built by Mir Jumlah [*vide* Journal, As. Soc., Bengal, 1872, Pt. I, p. 96]. The place called Bandar is now a mile inland (*vide* Pl. IV), but during the height of the rains, the K'hál is navigable for native boats. The inscription is the most perfect as yet met with in this District."

قال الله تعالى و ان المساجد لله فلا تدعوا مع الله احدا * قال النبي
صلي الله عليه وسلم من بنى مسجدا بنى الله له قسرا في الجنة *
بنى هذا المسجد المبارك الملك المعظم بابا صالح في زمان السلطان
ابن السلطان جلال الدنيا والدين ابوالمظفر فتح شاه السلطان ابن محمود
شاه السلطان خلد الله ملكه و سلطانه في تاريخ اول شهر ذى القعدة سنة
ست و ثمانين و ثمانماية من الهجرة النبوية //

God Almighty says, 'The mosques belong to God. Do not associate any one with God.' The Prophet, may God bless him!—says, 'He who builds a mosque, will have a castle built for him by God in Paradise.'

This auspicious mosque was built by the great Malik Bárá Sálíh in the reign of the king, the son of the king, Jaláluddunyá waddín Abul Muza'far Fath Sháh, son of Mahmúd Sháh, the king—may God perpetuate his kingdom and rule!—on the 1st Zil Qa'dah, 886, A. H. (2nd January, 1482, A. D.).

The builder of the mosque appears to have been a very pious man. Three miles west from Sunnargáon, Dr. J. Wise discovered a mosque built by the same man, and adjoining the mosque his tomb. The masjid is within half a mile of the mosque to which the preceding inscription belongs, and was built in 911, A.H. A portion of the date of the inscription is designedly, as it would appear, chipped off.

No. 17. *The Bárá Sálíh Inscription of Sunnargáon.*

قال الله تبارك وتعالى وان المساجد لله فلا تدعوا مع الله احدا بني هذا
المسجد المبارك في زمن السلطان علاؤ الدنيا و الدين ابو المظفر حسين
شاه السلطان خلد الله ملكه الملك المعظم المكرم خدام النبي حاجي
الحرمين وزائر القديمين حاجي بابا صالح * * * دي * * * وتسعمائة من
الهجرة النبوية //

God Almighty says, &c. [as above]. This blessed mosque was built in the reign of Sulṭān 'Aláuddunyá waddín Abul Muza'far Husain Sháh, the king,—may God perpetuate his reign!—by the great and liberal Mahk, the servant of the Prophet, who has made a pilgrimage to Makkah and Madínah and has visited the two footprints of the Prophet, Hájí Bárá Sálíh. Dated 911, A.H.

The wanting words are no doubt *عشر حادي* عشر, which would be 911. A small slab let in the brick work of Baba Sálíh's tomb contains the following date of his death.

No. 18. *The Inscription on Bárá Sálíh's Tomb.*

الله لا اله الا هو ليجمعنكم الى يوم القيامة لا ريب فيه و من اصدق من
الله حديثا //

* * * روضة الحاجي الحرمين الزائر القديمين خدام النبي عليه السلام
حاجي بابا صالح اله * * * في تاريخ * * * ربيع الاول من سنة اثني * * *

O God! There is no God but He. He will surely collect you towards the day of resurrection, and who is more truthful a speaker than God? [Qor., IV. 86.] * * the tomb of the pilgrim to Makkah and Madínah, who has visited both footprints of the Prophet, the servant of the Prophet (upon whom be peace!), Hájí Bárá Sálíh * * (almutawaffá, who died) on ... Rabi' L., ... 2.

Thus it seems that he died in A. H. 912. Dr. Wise says—"No one here has heard of the name of this pious man. The neighbourhood of these mosques is very old. Qadam Rasúl (the 'Footprint of the Prophet'), a famous place of pilgrimage, on a mound some sixty feet high, is a little to the north-west. Gangakol Bandar is on the west, and across the Lak'hya River is Khizrpúr with the ruins of what I believe was the residence of 'Isá Khán, mentioned in the *Áin i Akbarí*."

A third mosque built by Bába Sálíh is in 'Azímnagar, District Dháká.

No. 19. *The Bába Sálíh's Inscription of 'Azímnagar.*

قال النبىّ صلى الله عليه وسلم عجلوا بالصاوة قبل الفوت و عجلوا
بالذوبة قبل الموت * بني هذا المسجد المبارك المعظم المكرّم
بابا صالح و قد تمّ بناء هذا المسجد في أوّل المحرم سنة ٩١٠

The Prophet—may God bless him!—says, 'Make quick the prayer before the end, and hasten the naubat before death. This blessed mosque was built by the exalted, liberal Malik, Bába Sálíh, and the building was completed on the first Muharram 910 [or 901,—the numbers are unclear].

No. 20. *The Fath Sháh Inscription on Adam Shahíd's Mosque at Bikrampúr (Dháká District). A. H. 888.*

General Cunningham and Dr. J. Wise have each sent rubbings of this inscription.

قال الله تعالى و إنّ المساجد لله فلا تدعوا مع الله احدا قال النبىّ
صلى الله عليه وسلم من بني مسجد في الدنيا بني الله له مثله في
الجنة بنى هذا المسجد الجامع الملك المعظم ملك كافور في زمان
السلطان ابن السلطان جلال الدنيا و الدين ابو المظفر فتح شاه السلطان
ابن محمود شاه السلطان في تاريخ اوسط شهر رجب سنة ثمان و ثمانين
و ثمانماية ١١

God Almighty says, &c., [as above]. This Jami' Masjid was built by the great Malik, Malik Káfur, in the time of the king, the son of the king, Jaláluddunyá waddin Abul Muzaffar Fath Sháh, the king, son of Mahmúd Sháh, the king, in the middle of the month of Rájab, 888, A. H. (August, 1488, A. D.)

Dr. Wise writes as follows—

'The Masjid of Adam Shahíd is in Bikrampúr at a village called Qází Qabáh, within two miles of Ballálbári, the residence of Ballál Sen. Mr.

Taylor, in his "Topography of Dacca" states that Adam Shahíd, or Bábbá Adam, was a Qázi, who ruled over Eastern Bengal. He gives no authority for this statement, and, at the present day, the residents of the village are ignorant of this fact. They relate that Bábbá Adam was a very powerful Darwish, who came to this part of the country with an army during the reign of Ballál Sen. Having encamped his army near 'Abdullahpúr, a village about three miles to the N. E., he caused pieces of cow's flesh to be thrown within the walls of the Hindú prince's fortress. Ballál Sen was very irate, and sent messengers throughout the country to find out by whom the cow had been slaughtered. One of the messengers shortly returned and informed him that a foreign army was at hand, and that the leader was then praying within a few miles of the palace. Ballál Sen at once galloped to the spot, found Bábbá Adam still praying, and at one blow cut off his head.

'Such is the story told by the Muhammadans of the present day, regardless of dates and well-authenticated facts.

'The Masjid of Bábbá Adam has been a very beautiful structure, but it is now fast falling to pieces. Originally, there were six domes, but three have fallen in. The walls are ornamented with bricks beautifully cut in the form of flowers and of intricate patterns. The arches of the domes spring from two sandstone pillars, 20 inches in diameter, evidently of Hindú workmanship. These pillars are eight-sided at the base, but about four feet from the ground they become sixteen-sided. The *mihrábs* are nicely ornamented with varied patterns of flowers, and in the centre of each is the representation of a chain supporting an oblong frame, in which a flower is cut.

'The style of this Masjid is very similar to that of the old Goáldih Masjid at Sunnárgháon and to that of 'Tsá Khán's Masjid at Khizrúpúr.*

No. 21. *The Fath Sháh Inscription of Sunnárgháon.* A. H. 889.

General Cunningham has sent a rubbing of the following inscription—

قال الله تعالى و ان المساجد لله فلا تدعوا مع الله احدا * وقال النبي
صلي الله عليه وسلم من بنى مسجدا بنى الله له سبعين قسرا في
الجنة * بنى هذا المسجد في عهد السلطان الاعظم المعظم جلال الدنيا

* Dr. Wise, in one of his letters addressed to the Society, makes the following remark on Sher Sháh's road from the Brahmaputra to the Indus.

"I see in the last volume of Elliot's 'History of India' that doubts are expressed of there ever having been a road made from Sunnárgháon to the Indus by Sher Sháh, as mentioned by Firishtah and others. In this district there are two very old bridges, which local tradition states were constructed by that monarch, and which lie exactly where such a road would have been. One is still used, the other has fallen in."

و الدّین ابو ا مظفر فتح شاه السّطان ابن محمود شاه السّطان خلد الله
 ملكه و سلطانه * بانى المسجد مقرب الدولة ملك . . . الدّین سلطاني
 جامدار غير محلي و سرلشكر و وزير اقليم معظم آباد و نیز مشهور محمود آباد و
 سرلشكر تهانه لود و كان ذلك فى التاريخ من المحرم سنة تسع و ثمانين
 و ثمانماية ١١

God Almighty says, &c., (as before). And the Prophet says, &c., (as before).

This mosque was built during the reign of the great and exalted king, Jalál-uddunyá waddín Abul Muza'ffar Fath Sháh, the king, son of Mahmúd Sháh, the king,—may God perpetuate his kingdom and rule! The builder of the mosque is Muqarrab uddulah, Malik.....uddín, the Royal, keeper of the wardrobe outside the Palace, the commander and wazir of the territory of Mu'azzama-bád, also known as Mahmúdábád, and commander of Thánah Láuq. This took place during Muharram, 889. (A. D. 1484.)

The geographical names occurring in this inscription have been discussed above.

THE HABSHI' KINGS.

The pretorian band of Abyssinians, which Bárbak Sháh had introduced into Bengal, became from the protectors of the dynasty the masters of the kingdom, and eunuchs were the actual rulers of the country. The very names of the actors during the interregnum between the end of the Ilyás Sháh dynasty and the commencement of the house of Husain Sháh, proclaim them to have been Abyssinian eunuchs;* and what royalty at that time was in Bengal is well described by Abul Fazl, who says that, after the murder of Fath Sháh, low hirelings flourished;† and Firishtah sarcastically remarks that the people would only obey him who had killed a king and usurped the throne. Faria y Souza also says of the kings of that time:—

“They observe no rule of inheritance from father to son, but even slaves sometimes obtain it by killing their master, and whoever holds it three days they look upon as established by divine providence. Thus it fell out that in 40 years' space they had 13 kings successively.”

* Names as Káfur (camphor), Qaranful (clove), Fírúz and Fírúzah (turquoise), Almás (diamond), Yáqút (cornelian), Habshí Khán, Indíl, Sídí Badr, &c. Camphor was looked upon as an anti-aphrodisiac (*vide* my *Áfn* translation, p. 385); hence the name was appropriate. The Fath Sháh inscription No. 20 mentions a Malik Káfur; and we are reminded of the Káfur Hazárdínárí of 'Aláuddín's reign.

† ‘The kings of Bengala, in times past, were chosen of the Abassing or Æthiopian slaves, as the Soldans of Cairo were some time of the Circassian Mamalukes,’ *Purchas*.

The Habshí kings are Sultán Sháhzádah, Fírúz Sháh, and Muzaffar Sháh. Mahmud Shah II appears to belong to the old dynasty.

XVII Sulta'n Sha'hza'dah

(Bírbak, the Eunuch)

The owner of this odd title reigned either two and a half months (Tabaqat and Firishtah), or perhaps eight months (Firishtah), or according to a pamphlet which the author of the Riyaz possessed, six months. He was murdered by

XVIII Saifuddín Abul Muzaffar Fírúz Sha'h (II)

(Malik Indil Habshí)

He had been a distinguished commander under Fath Shah, and proved a good king. According to the histories, he died a natural death after a reign of three years, in 899,—a wrong date. The Riyaz says that a mosque, a tower, and a reservoir, in Gaur were built by him.

The coin published by Musden as belonging to this king, has been shown by Mr. Thomas to belong to Fírúz Shah Bulmání.

The following passage from João de Barros refers to either this king or Husun Shah —

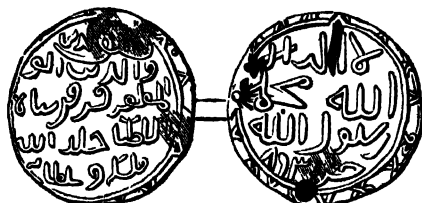
'One hundred years before the Portuguese visited Chitgaon, a noble Arab arrived there from 'Adm (Aden) bringing with him 200 men. Seeing the state of the kingdom, he began to form ambitious projects of conquest. Dissimulating his intentions he set himself up as a commercial agent and on this pretext added to his followers a reinforcement of 300 Arabs, thus raising his total force to 500 men. Having succeeded through the influence of the *Mandarins*, who were the governors of the place, in procuring an introduction to the king of Bengal he assisted that monarch in subduing the king of Orissa his hereditary foe. For this service he was promoted to the command of the King's body guard. Soon afterwards he killed the king, and himself ascended the throne. The capital was at this time at Gaur.'

The chronology of Fírúz Shah II's reign may be fixed with the help of the following, apparently unique, coin, the original of which is in the British Museum. Col. Guthrie kindly sent the Society a cast, from which the woodcut below has been made. The coin gives the year 893 (A. D., 1468). This year entirely agrees with the ascertained dates of Jaláluddin Fath Shah's reign, and with the earliest ascertained year of Muzaffar Shah. Fírúz Sháh II, therefore, reigned from 893 to 895, or 896. The former, 895, is perhaps preferable to 896, because both Mahmud Shah and Muzaffar Shah reigned in 896.

I. Fírúz Sháh II Silver. No mint town. A. H., 893. (A. D. 1468.) No margs.

OBVERSE.—سیف الدنیا والدین ابوالمظفر فیروز شاہ السلطان خلد اللہ ملکہ
وسلطانہ

REVERSE.—لا اله الا الله محمد رسول الله خزائنہ ۸۹۳



Saifuddunyá waddín Abul Muzaḥfar Fírúz Sháh, the king,—may God perpetuate his kingdom and rule! There is no God but Allah, Muhammad is the Prophet of God. Treasury issue of 893.

XIX. Na'siruddi'n Abul Muja'hid Mahmu'd Sha'h (II).

He was raised to the throne on Fírúz Sháh's death, though the government was in the hands of one Habshí Khán. After a short time, Habshí Khán, and immediately after, Mahmúd Sháh, were killed by Sidi Badr Díwánah, who proclaimed him-self king.

Though the histories call Mahmúd the son of Fírúz Sháh, there is little doubt that the statement of Háji Muhammad Qandahárí, preserved by Firishtah, is correct—"In the history by Háji Muhammad Qandahari,* it is written that Sultán Mahmúd was the son of Fath Sháh, and that Habshí Khán was a eunuch of Bárbak Shah, who by Fírúz Sháh's orders had brought up Mahmúd. After Fírúz Sháh's death, Mahmúd was placed on the throne; but when six months had passed, Hab-hí Khán shewed inclination to make himself king, and Sidi Badr killed him." These facts agree well with the following circumstances: *First*, all histories say that Fath Sháh, at his death, left a son two years old, and his mother, at Sultán Sháhzádah's death, declared herself willing to leave the throne to him, who had brought her husband's murderer to account. *Secondly*, according to Muhammadan custom, children often receive the names of the grandfather; hence Fath Sháh would call his son Náqiruddin Mahmúd; but as the *kunya* must be different, we have here 'Abul Mujáhid,' while the grandfather has 'Abul Muzaffar.'

General Cunningham found the following inscription of this king in Gaur; unfortunately, the date is illegible.

* The Lak'hnaú edition of Firishtah calls him 'Háji Mahmád.' His historical work is not known at the present day.

No. 22. *The Mahmūd Sháh (II) Inscription of Gaur.* (A. H. 896 ?)
(Pl. VII, No. 3.)

قال النبي صلى الله عليه وسلم من بني مسجدا لله بني الله له قصر
في الجنة * بني المسجد في عهد سلطان الزمان بالعدل والاحسان غوث
الاسلام والمسلمين ناصر الدنيا والدين ابوالمجاهد محمود شاه السلطان
خله الله ملكه و سلطانه بنى المسجد الخان الاعظم المعظم الخ مجلس
خان *** في التاريخ الثالث والعشرين من شهر ربيع الا [ول سنة ست
وتسعين وثمانماية ؟]

The Prophet (may God bless him¹) says, 'He who builds, &c., [as before]. This mosque was built in the reign of the king of the time, (who is endowed) with justice and liberality, the help of Islám and the Muslims, Nâqiruddunyâ waddín Abul Muja'hid Mahmúd Sháh, the king—may God perpetuate his kingdom and rule!—by the great and exalted Khán Ulugh Majlis Khán (illegible). Dated, 23rd Rabi'

Marsden has published a silver coin of this king, which has likewise no date (*vide* Numism., Pl. XXXVI, No. DCCXXIV); but, as Laidley correctly observes, he ascribes it wrongly to Mahmúd Sháh of Dihlí. The legend of the coin is—

REVERSE.—(?) المريد بتايد الرحمن خليفة الله بالعدل والاحسان

OBVERSE.—السلطان العادل ناصر الدنيا والدين ابوالمجاهد محمود شاه السلطان

The words *bil'adl wal-ahsán* are not clear, they may also be بالعصرو الزمان as elsewhere suggested by me; but the former coincides with the phrase used in the inscription. I cannot see the word *فمجاناد*, which Laidley gives.

According to the chronological remarks made by me regarding the reign of Firuz Sháh, we have to place Mahmúd Sháh's reign in 896, A. H.

XX. Shamsuddi'n Abul-Nasr Muzaffar Sha'h. (Sidi Badr Diwanah.)

The reign of this king, who is represented to have been a blood-thirsty monster, is said in all histories to have lasted three years and five months; but his death at the hands of the next king cannot have taken place in 903, because his coins and inscriptions mention the years 896 and 898. He must, therefore, have been killed in 899, the first year in which Husain Sháh struck coins.

A Muzaffar Sháh inscription was published by me in the *Journal* for 1872, p. 107, from an imperfect rubbing. Since then Mr. W. M. Bourke

has sent me a clear rubbing with the date distinct. I, therefore, republish it with a corrected translation.

No. 23. *The Muzaffar Sháh Inscription of Gangarámpúr.*

A. H. 896. (A. D. 1491.)

بني هذه العمارة المسجد في عهد المخدم المشهور قطب اوليا مخدوم
مولانا عطا طيب الله ثراه و جعل الجنة مغواه في عهد شمس الدنيا
والدين ابو النصر مظفر شاه سلطان خلد الله ملكه و سلطانه في التاريخ
ست و تسعين و ثمانماية ١١

This mosque was built in the time ⁽²⁾ of the renowned saint, Mauláná 'Atá—may God render his grave pleasant and may He make Paradise his dwelling place!—during the reign of Shamsuddunyá waddín Abul-Naqr Muzaffar Sháh, the king—may God perpetuate his kingdom and his rule! Dated, A. H. 896

Mr. Bourke's rubbing shews that the word *samánmiah* is cut into the second bar, which separates the third line from the second. Below the last line there is another line cut into the lowest bar; but the letters are too small and partly broken to admit of a satisfactory reading. I can recognize the words 'Mullá Mubárák' and *mi'már*, 'builder.'

Laidley has published a silver coin of this king, the legend of which is (*vide* J. A. S. B., Vol. XV, for 1846, Pl. V, No. 19)—

OBVERSE.—شمس الدنيا و الدين ابو النصر مظفر شاه السلطان خلد الله ملكه
و سلطانه

Margin.—Cut away.

REVERSE.—The Kalimah. Year, illegible.

Margin—the four Khalifas.

The Honorable E. C. Bayley is about to publish a gold Muzaffar Sháhí, which seems to be of 896, A. H.

Muzaffar Sháh, according to the Riyáz, built a mosque in Gaur. General Cunningham has sent the Society a rubbing of another inscription from the Chhotá Dargáh (Núr Quṭb 'Alam's Dargáh) in Hazrat Panduah. It is, in point of execution, a very fine inscription.

No. 24. *The Muzaffar Sháh Inscription of Panduah.* A. H. 898.

Vide Pl. VI, No. 2.

قال الله تعالى ان اول بيت وضع للناس للذي ببكة مباركا و هدي
للعالمين فيه آيات بيّنات مقام ابراهيم و من دخله كان آمنا والله اعلم
الناس حج البيت من استطاع اليه سبيلا و من كفر فان الله غني

عن العالمين • بني في البيت الصخرة الروضة قطب الانطاب قتيل
 محبب وهاب شيخ المشايخ حضرت نور الحق والتسرع سيد قطب عالم
 قدس الله سره العزيز ونور الله بيرة * بني هذا البيت في عهد السلطان
 العادل البذل الفاضل غوث الاسلام والمسلمين شمس الدنيا والدين
 ابوالنصر مظفر شاه سلطان خلد الله ملكه وسلطانه و اعلى امره وشاه
 بني هذا البيت في خلافة شيخ الاسلام والمسلمين شيخ المشايخ ابن شيخ
 المشايخ شيخ محمد غوث سلمه الله تعالى دائما مؤرخا فى السبع والعشر
 من شهر رمضان مبارك فى سنة ثمان تسعين ثمانماية ||

God Almighty says, 'Verily, the first house that was founded for men, is the one in Bakkah [Makkah], blessed, and a guidance to all beings. In it are clear signs: the place of Abraham, and who entered into it, was safe, and God enjoined men to visit it, if they are able to go there, but whosoever disbelieves, verily God is independent of all beings [Qor III 90 to 92]

In this Sûfi building the tomb of the pole (*qutb*) of poles was built, who was slain by the love of the All-Giver, the Shaikh of Shaikhs, Hazrat Nûr ul Haq washshara', Sayyid Qutb 'Alam—may God sanctify his beloved secret, and may God illuminate his grave! This house was built in the reign of the just, liberal, learned king, the help of Islâm and the Muslims, Shamsuddanya waddin Abul- Naqr Muzaffar Shâh, the king, may God perpetuate his kingdom and rule, and may He elevate his condition and dignity! This house was built during the *khilâfat** of the Shaikh ul Islâm, the Shaikh of Shaikhs son of the Shaikh of Shaikhs, Shaikh Muhammad Ghous—may God Almighty ever protect him!

Dated, 17th Ramazan, 898. [2nd July, 1493.]

Nûr Qutb 'Alam was mentioned above among the Saints of Panquah.

THE HUSAINÍ DYNASTY.

On Muzaffar Shâh's death in 899, 'Alâuddin Husain Shâh, son of Sayyid Ashraf, usurped the throne. Of the reign of no king of Bengal—perhaps of all Upper India before the middle of the 10th century—do we possess so many inscriptions. Whilst the names of other Bengal kings scarcely ever occur in legends and remain even unrecognized in the geographical names of the country, the name of "Husain Shab, the good," is still remembered from the frontiers of Orisâ to the Brahmaputra.

I have treated of the chronology of the reigns of Husain Shâh and his successors in my article, "On a new king of Bengal, &c.," published in the Journal, for 1872, Pt. I, pp. 331 to 340, and according to that paper, we have—

* The reign, if I may say so, of a spiritual teacher.

1. 'Aláuddín Abul Muzaffar Husain Sháh, 899 to 927 (929 P).
2. Náçiruddín Abul Muzaffar Nuçrat Sháh, 927 (929 P) to 939.
3. 'Aláuddín Abul Muzaffar Firúz Sháh (III.), 939.
4. Ghiyásuddín Abul Muzaffar Mahmúd Sháh (III.), 940 to 944, (defeated by Sher Sháh).

I have now only to describe a few unpublished coins and to give several new inscriptions belonging to the reigns of these kings.

XXI. 'Ala'uddi'n Abul Muzaffar Husain Sha'h.

Marsden (Pl. XXXVIII, Nos. DCCCLXXIX and DCXCIII) has given two different Husain Sháhís, the former of Fathábád, 899, A. H., and the latter of Husainábád, 914, A. H.* Laidley has two new types, one struck at Husainábád, 912, A. H., and the other (*vide* his plate, No. 21) resembling that of Marsden, but with a different legend. The cabinet of the Asiatic Society contains a few new varieties, with and without dates.

1. *Vide* Pl. IX, No. 9. Silver. Weight, 163·57 grains. No mint-town. A. H. 900. (As. Soc. Bengal, one specimen). Circular areas; no margin.

OBVERSE. — السلطان العادل علا الدنيا و الدين ابو المظفر

REVERSE. — حسين شاه سلطان بن سيد اشرف الحسيني خلد ملكه و سلطانه ٩٠٠

Col. Guthrie in a MS. list of Bengal Coins in the British Museum quotes Husain Sháhís struck at Jannatábád (Husainábád ?) in 918 and 919.

The inscriptions belonging to Husain Shah's reign are most numerous; the date of the latest two is 925, A. H. Those of which the Society has received rubbings from General Cunningham are marked [G. C.].

1. *Munger*, 903; mentions Prince Dányál. Published *Journal*, 1872, p. 335. [G. C.].

2. *Machain, Parganah Ballipúr, Dhákú*, 22nd Jumáda I, 907, or 3rd December, 1501. Received from Dr. J. Wise.

3. *Bonhara*, in Bihár, 908. Published, *Proceedings* 1870, p. 112.

4. *Oheran*, in Bilár, 909. Published, *Proceedings* 1870, p. 297.†

* Marsden reads the latter date 917. On the former coin, the king's first name is spelt علاو الدين, instead of علاء الدين, with an intermediate *váw*. This *váw* should not be read: it arises from a whimsical rule of a class of pedantic Kátibs who maintain that the vowel *u* after a long *á*, as in 'Aláu, requires "a support."

The obverse of the latter coin, to which I alluded in the note to p. 301 of the *Journal* for 1870, Pt. I, is still a puzzle to me, though I have wasted much time in looking at the coin, patiently waiting for a happy guess. I now believe that the second line is القائم بسلطنته *alqáim bisalṭanatihi*, the last word being written disconnected, as *sulṭánahu* on the reverse. But the third line is unclear. The weight of the coin is 162·64 grains.

† For a Gaur Inscription of 900, *vide* Glasier, *Report on Bangalore*, 1873, p. 108.

5. *Silhat*, 911. From Dr. Wise.
 6. *Maldah*, 911. [G. C.]
 7. *Sunnárgaon*, 911. Given above, No. 17.
 8. *Hazrat Panđuah*, 915. [G. C.]. The rubbing is unclear.
 - 9 to 11. *Gaur*, two of 916, and one of 918. [G. C.]
 12. *Sunnárgaon*, 2nd Rabi' II., 919, or 7th June, 1518. [G. C.]
- Published, Journal, 1872, p. 333.
13. *Birbhúm*, 922. Published, Journal, 1861, p. 390.
 14. *Dhámra*, 922. Published, Journal, 1872, p. 110.
 15. *Sunnárgaon*, 15th Sha'bán, 925, or 12th August, 1519. [G. C.]
 16. *Gaur*, 925, or A. D. 1519. Published with plate, J. A. S. B., 1871, Pt. I, p. 256.

No. 25. *The Husain Sháh Inscription of Machain.* (A. H. 907.)

قال إلهي صلي الله عليه وسلم من بني مسجد لله بني الله له
 بيتا مثله في الجنة * بني هذا المسجد الجامع لسلطان المعظم المكرم علاء
 الدنيا والدين ابو المظفر حسين شاه السلطان بن سيد اشرف الحسيني
 خلد الله ملكه و سلطانه في الثاني والعشرين من جمادي الاول سنة
 سبع و تسعمائة ||

The Prophet says, &c., &c. (as before). This Jami' mosque was built by the great and liberal king 'Alauddunyawaddin Abul Muzaffar Husain Sháh, the king, son of Sayyid Ashrat ul-Husain—may God perpetuate his kingdom and rule!

Dated, 22nd Jumada I, 907. (3rd December, 1501).

No. 26. *The Husain Sháh Inscription of Silhat.* A. H. 911.

بسم الله الرحمن الرحيم * الأمر لهذه العمارة البقعة المباركة المنصوبة بدار
 الاحسان حرم الله تعالى من مخافة الزمان العابد العالي الكبير * * شيخ
 جلال مجرد كنيائي قدس الله تعالى سره العزيز في عهد السلطان علاء
 الدنيا والدين ابو المظفر حسين شاه السلطان خلد الله ملكه و سلطانه بكار
 خاناعظم وخاناعظم خالصخان جامدار غير محلي و سراسكرو وزير اقليم
 معظم آباد سنة احدى عشر و تسعمائة ||

In the name of God, the merciful and the clement! He who ordered the erection of this blessed building, attached to the house of benefit (Silhat)—may God protect it against the ravages of time!—is the devotee, the high, the great, *** Shaikh Jalál, the hermit, of Kanyá—may God Almighty sanctify his dear secret! It was built during the reign of Sultan 'Alauddunyawaddin Abul Muzaffar Husain Sháh, the king, by the great Khán, the exalted Kháqán, Kháfiq Khán,

keeper of the wardrobe outside the palace, commander and wazir of the District Mu'azzamabad In the year 911 (A. D. 1505).

In this inscription Shaikh Jalal, whose biography was given under Yúsuf Shah, is called Kanyáí, i. e. of Kanyá, which appears to be a place in Arabia.

He is said to have 'ordered' the erection of the building. This can only refer to an order given in a dream, as in the case of 'Alí Sháh and Jalál Tabrizí.

No. 27. *The Husain Sháh Inscription of Máldah.* A. H. 911.

قال النبىّ صلى الله عليه و سلم من بنى مسجدا لله بنى الله له
بيتا مثله فى الجنة * بنى هذا المسجد الجامع السلطان المعظم المكرّم علاء
الدنيا والدين ابو المظفر حسين شاه السلطان من سيد اشرف الحسينيّ
خلد الله ملكه و سلطانه فى سنة احدى عشر و تسعمائة ||

The Prophet says, &c , &c This Jami' mosque was built by the great and liberal king 'Alauddunya waddin Abul Muzaffar Husain Sháh, the king, son of Sayyid Ashraf ul Husaini—may God perpetuate his kingdom and rule! In the year 911. (A. D. 1505).

No 28. *A Husain Sháh Inscription from Gaur.* A. H. 916.

قد بنى هذا الباب الروضة مخدوم شيخ اخي سراج الدين السلطان
المعظم المكرّم علاؤ الدنيا والدين ابو المظفر حسين شاه السلطان من سيد
اشرف الحسينيّ خلد الله ملكه و سلطانه فى سنة ستّ عشر و تسعمائة ||

The door of the tomb of the venerated Shaikh Akhí Sirájuddin was built by the great and liberal king 'Alauddunya waddin Abul Musaffar Husain Sháh, the king, son of Sayyid Ashraf ul-Husaini—may God perpetuate his kingdom and rule! In the year 916. (A. D. 1510.)

Shaikh Akhí was mentioned above among the saints of Gaur.

No. 29. *Another Husain Sháh Inscription from Gaur.* A. H. 916.

بنى هذا الباب الروضة فى عهد السلطان المعظم المكرّم علاؤ الدنيا
والدين ابو المظفر حسين شاه السلطان من سيد اشرف الحسينيّ خلد الله
ملكه و سلطانه و اعلى امره و شانه و اعزّ خياره و برهانه فى سنة ستّ
عشر و تسعمائة ||

The door of this tomb was built during the reign of the exalted and liberal king, 'Aláuddunyá waddín Abul Muza'ffar Husain Sháh, son of Sayyid Ashraf ul-Husaini,—may God perpetuate his kingdom and rule, and elevate his condition and dignity, and may He render his benefits and evidences honorable! In the year 916. (A. D. 1510.)

No. 30. *A third Husain Sháh Inscription from Gaur.* A. H. 918.

بني هذا الباب الحصن في عهد السلطان المعظم المكرم علاؤ الدنيا
والدين ابو المظفر حسين شاه السلطان بن سيد اشرف الحسيني خلد الله
ملكه و سلطانه في سنة ثمان وعشرو تسعمائة ||

This gate of the Fort was built during the reign of the exalted and liberal king 'Aláuddunya waddín Abul Muza'ffar Husain Shah, the king, son of Sayyid Ashraf ul-Husaini,—may God perpetuate his kingdom and his rule! In the year 918. (A. D. 1512.)

No. 31. *The Husain Sháh Inscription of Sunnárghón.* A. H. 925.

قال الله تعالى و ان المساجد لله فلا تدعوا مع الله احدا والله اعلم
بالصواب قال النبي صلى الله عليه و سلم من بنى المسجد في الدنيا
بني الله له سبعين قصرا في الجنة * بني هذا المسجد في عهد
سلطان السلاطين سلطان حسين شاه ابن سيد اشرف الحسيني خلد ملكه
و سلطانه * بني هذا المسجد ملا عمر اكبر خان بتاريخ پانزدهم ماه شعبان
سنة خمس و عشرون و تسعمائة ||

God Almighty says, Surely the mosques, &c., (as before). And the Prophet says, &c., &c., (as before).

This mosque was built in the reign of the king of the kings, Sultan Husain Sháh, son of Sayyid Ashraf ul-Husaini,—may God perpetuate his kingdom and rule! This mosque was built by Mulla Husabr Akbar Khan, on the 15th Sha'bán, 925. (12th August, 1519.)

XXII. Na'iruddín Abul Muza'ffar Nusrat Sháh.

Of the inscriptions belonging to the reign of this king, I have published three, viz.—

1. *Sunnárghón*, 929, or 1523. [G. C.] Published, *Journal*, 1873, p. 388.

2. *Sátgón*, Ramazán, 986, or May, 1529. Published, Journal, 1670, p. 298.

8. *Gaur*, Qadam Rasúl, 937, or 1530-31. [G. C.] Published, Journal, 1872, p. 338. *Vide* Glazier, Rangpore Report, p. 108.

A few weeks ago I received a black basalt slab from the old mosque in Mangalkot, Bardwán District, with the following inscription—

No. 32. *The Nuçrat Sháh Inscription from Mangalkot.* A. H. 930.

قال النبي صلى الله عليه وسلم من بني مسجدا لله بني الله له بيتا
مثله في الجنة بني هذا المسجد الجامع في عهد السلطان المعظم السلطان
بن السلطان ناصر الدنيا والدين ابو المظفر نصرتشاه السلطان بن حسين
شاه السلطان خلد الله ملكه وسلطانه وبانيه خان ميانمعظم بن مراد
حيدر خان دام عزه في سنة ثلثين وتسعمائة ١١

The Prophet says, He who builds, &c., (as before). This Jámí' Mosque was built in the reign of the exalted king, who is the son of a king, Naçiruddunyá waddín Abul Muzaffar Nuçrat Sháh, the king, son of Husain Sháh, the king—may God perpetuate his kingdom and rule! Its builder is Khan Miyán Mua'zzam, son of Murád Haidar Khan—may his honor continue! In the year 930, A. H. (A. D. 1524)

The following important inscription I owe to the kindness of J. R. Reid, Esq., C. S., A'zamgarh, N. W. Provinces, who sent me a rubbing. The slab was found on the right bank of the G'hágrá, near Sikandarpúr.

No. 33. *The Nuçrat Sháh Inscription of Sikandarpúr, A'zamgarh.*
A. H. 933.

لا اله الا الله محمد رسول الله قال النبي صلى الله عليه وسلم من بني
مسجدا مي الدنيا بني الله تعالي له سبعين قسرا في الجنة * المتناس
لهذا المسجد في عهد الملك العادل ناصر الدنيا والدين ابو المظفر نصرتشاه
بن حسين شاه السلطان جعل الله في زمرة عباده أكر المجيد و هو
خانااعظم محمدا خان سرلشكر درة خريد في شهر الرجب ٢٧ سنة ثلث
و ثلثين وتسعمائة ١١

There is no God, &c. He who builds a mosque, &c. The founder of the mosque, during the reign of the just king Naçiruddunyá waddín Abul Muzaffar Nuçrat Sháh, son of Husain Sháh, the king—may God place him among the number of his servants!—is the great Ulur [Ulugh], i. e. the great Khán, Khán, commander of the district of Kharid. On the 27th Rajab 933. (29th April, 1527.)

The inscription confirms the histories, according to which Nuçrat Sháh extended his authority over the whole of Northern Bihár; and as Kharid lies on the right bank of the G'hágrá, Nuçrat Sháh must have temporarily held sway in the A'zamgarh District.

The coinage of this king contains numerous varieties, among which there are several struck by him during the lifetime of his father. The latter coins are mostly of a rude type, and look debased; besides, they are restricted to the Sundarban mint town of Khalifatábád (Bágherhát) and to Fathábád. They either indicate an extraordinary delegation of power or point to a successful rebellion.

1. *Vide* Pl. IX, No. 10. Silver. Weight, 154·06 grains. *Khalifatábád*, 922, A. H. (As. Soc. of Bengal). Circular areas; no margin.

OBVERSE.—السلطان بن السلطان ناصر الدنيا و الدين ابو المظفر

REVERSE.—نصره شاه السلطان بن حسين شاه السلطان الحسيني خلد ملكه

حليفا آباد ٩٢٢

3. *Vide* Pl. IX, No. 11. New variety. Silver. Weight, 163·14 grains. *Mint town?* A. H., 927. (Cabinet, As. Soc. of Bengal.) Circular areas; no margin.

OBVERSE.—السلطان بن السلطان ناصر الدنيا و الدين ابو المظفر

REVERSE.—نصرته شاه السلطان بن حسين شاه السلطان خلد الله ملكه

وسلطان ٩٢٧

3. *Vide* Pl. IX, No. 12. New variety. Silver. Weight, 162·952 grains. No mint town, or year. Circular areas, and scollops in the margin. The characters are neat. (As. Soc. Bengal)

OBVERSE.—As in the preceding

REVERSE.—[يد هرمزد ؟] نصرته شاه السلطان ابن حسين شاه السلطان خلد ملكه

I am doubtful as to the correctness of the last words *yad i Hurmuzd*, 'by the hand (engraved by) Hurmuzd.' The characters, though smaller, are clear, and yet it is difficult to suggest anything else.

The years of the three Nuçrat Sháhís published by Marsden and Laidley are not clear; they may be 924 (Marsden) and 927, or 934 and 927. The Cabinet of the As. Soc. of Bengal, besides the above, contains six different types, among which there is a silver coin struck at *Nuçratábád*, 924 A. H., but it is not clear to what locality this new name was applied.

Nuçrat Shah's name as prince seems to have been Naçíb Khán; at last this would explain why the histories call him Naçíb Sháh.

He was succeeded by his son

XXIII. 'Ala'uddín Abul Musaffar Fir'uz Sha'h (III).

The Kalnah inscription (A. H. 939) of this king, which I published in the *Journal* for 1872, Pt. I, p. 332, is of some importance, and I now give a plate of it (*vide* Pl. VII, No. 2). The name of this king is only

mentioned in the *Riyáz*, and though we do not know his source, his statements have, in several instances, been proved to be correct. In the MS. of his work in the As. Soc. of Bengal—the only copy I know of at present—this king is said to have reigned three *years*, which is impossible;* but Stewart found three *months* in the copy which he consulted.

The Society's cabinet possesses a specimen of this king's coinage, struck in 939, A. H., the same year as mentioned in the Kalnah inscription.

1. *Vide* Pl. IX., No. 18. Silver. Weight, 163·215 grains. *Husain-ábád*, 939, A. H. Circular areas. The margins are divided into four quadrants, at the beginning of each of which there is the letter *nún*, and in each quadrant there is an arabesque, which looks like the word *نصر*. The same design is given on Marsden's Nuçrat Shah.

OBVERSE.—السلطان بن السلطان علاؤ الدین ابو المظفر فیروز شاہ

REVERSE.—بن نصرنشاہ السلطان بن حسین شاہ السلطان خلد اللہ ملکہ و سلطانہ
حسینا بان ۹۳۹

Firúz Shah III. was murdered by his uncle

XXIV. Ghiya's-uddi'n Abul Muzaffar Mahmu'd Sha'h (III).

General Cunningham's Gaur Inscription of this king, dated 941, was published by me in the *Journal*, for 1872, Pt. I., p. 339.

Our Society possesses a coin of Mahmúd Sháh of the same type as the one published by Laidley. He refers the coin to 933; but the Society's specimen has clearly 943 A. H. The concentric circles contain the words *badr i sháhi*, or 'royal moon.'

General Cunningham lately sent me the tracing of a Mahmúd Sháhí round copper coin, which has the same inscription on both sides, *viz.* العبد غیاث الدین محمود شاہ الیدرشاهی. But though the phrase *badr i sháhi* seems to shew that the coin belongs to Mahmúd Sháh (III.) of Bengal, it would be desirable to have specimens with dates or mint towns.

Mahmúd Sháh is mentioned in De Barros' work, from which the following facts are taken. Nuno da Cunha, the Portuguese governor of Goa [گوار], sent in 1534 Alfonso de Mello with two hundred men in five ships to Chátgáon, which then again belonged to Bengal, in order to effect a settlement. De Mello, on his arrival, thought it wise to send a few of his men with presents to Gaur, where Mahmúd Sháh, who tyrannically held the crown, kept his court, in great apprehension of being deposed, but with such state that only his women amounted to the number of 10,000; but though De Mello's men found in Alfá Khán† a friend, the king imprisoned them,

* The passage, however, is corrupt. *Vide Journal* for 1872, Pt. I., p. 339.

† This is, no doubt, the Alfá Husainí of Baghdád, mentioned by me in *J. A. S. B.*, 1872, Pt. I., p. 337.

and gave orders to seize De Mello in Chátgáon. The latter was shortly after treacherously captured with thirty of his men and was sent to Gaur,* where they were kept strictly confined, because Antony de Sylva Meneses had soon after taken reprisals and sacked Chátgáon. Now at that time Sher Khán and his brother 'Adil Khán had deserted from the Mughul to the king of Bengal. But Sher Khán wished to revenge the death of the youth whom Mahmúd had slain,—De Barros means Fírúz Sháh III.—to procure the throne. Sher Khán, therefore, made war on Mahmúd, and the king asked his Portuguese prisoners to assist him in the defence of Gaur. At the same time Rabelo arrived with three ships sent by the Goa Governor; to demand the release of the captives, and Mahmúd after securing their co-operation sent them to Gorij [Gaphi] near K'halgáon, where they valiantly, though in vain, opposed Sher Sháh. Mahmud, pleased with their prowess, applied to Nuno da Cunha for further assistance, but when Perez de Sampayo came with nine vessels, he found Gaur in the hands of Sher Khán and heard that Mahmud had been killed.

III

I now conclude this essay with my readings and translations of the Bihár collection of rubbings from the time of Muhammad Tughluq to the year 1455 A D

The first inscription is taken from the vault of one Sayyid Ahmad Pir-Pahár, regarding whom nothing is at present known in Bihár; but it seems to refer to the building of a portico by a near relation of Muhammad Tughluq.

No 34. *The Muhammad Tughluq Inscription of Bihár.* A. H. 737.

حمد گویم خدا برا صد نار مدح وافر باحمد مختار
 شد بنا گنبد فلک آسمان
 گیسوی آرا محمد مددگار سائے ایزدی بهر کشور
 بوالسجاده خلیفه با جواد
 بانی این عمارت المقصود هست بدو مبارک محمود
 دود خسروی بپیر شاه
 بوده این دولت از سرفرازی یاد کار سبکدین عازی
 چون مرتب شد این *** مقصد و سی و هفت بد گفتم

* The Portuguese describe Gaur as three leagues in length, well fortified and with wide and straight streets, along which rows of trees were planted to shade the people, "which sometimes is in such numbers that some are trod to death."

1. I praise God a hundred times, and abundantly glorify Ahmad, the elect.
2. This heaven-touching portico was erected
3. The world-adorning Muhammad, who breaks through the ranks, the shadow of God in every realm,
4. Abul Mujáhid, the Khalifah of high dignity,.....
5. The builder of this desirable edifice is the slave Mubarak Mahmúd,
6. Of royal descent, the grandson of Sháh.. ...
7. This dynasty, on account of its elevation, has obscured the memory of Subuktigín i Ghází.

When this...was erected, I said, it was 737, A. H. (A. D., 1336-37.)

If the name in the sixth line were not broken away, we might fix the name of the builder with the help of p. 454 of Baraní's history.

Nos. 35 to 37. *The Malik Ibráhím Bayyú Inscriptions of Bihár.*

The next three inscriptions belong to the Dargáh of Ibráhím Abú Bakr Malik Bayyú, who is *par excellence* the saint of Bihár. The shrine lies on the hill to the north-west of the town.

Malik Bayyú was first mentioned by Buchanan, who supposed him to be a purely mythological personage. Mr. T. W. Beale next published in his valuable *Miftáh uttawárikh* (p. 90) the first of the following inscriptions. Col. E. T. Dalton also mentions him in his 'Ethnology of Bengal' (p. 211), and says that Jangrá, a Santál Rájah, destroyed himself and his family in the Fort of Chai Champá, Hazáribágh District, when he heard of Malik Bayyú's approach.

The 'Mujáwirs' or custodians, of the shrine claim to be descended from the Malik. According to traditions still preserved among them, Ibráhím Malik Bayyú was an inhabitant of Butnagar, and was sent by Muhammad Tughluq to chastise Háns Kumár, Rájah of Rohtásgarh. The Rájah frequently came to Bargáon, the great Buddhist monastery, to worship. He oppressed the poor Muhammadans of the country. Now it happened that an old woman, a Sayyidah, killed a cow, in order to celebrate the nuptials of her grandson, when a kite snatched up one of the bones, and let it fall near the place where the Rájah worshipped. The Rájah was, of course, enraged, and put the Muhammadan bridegroom to death. At the advice of her friends, the old woman complained to Muhammad Tughluq. Being uncertain as to whom he should intrust with the command of an expedition against Háns Kumár, he consulted the astrologers. They told him, "This very night a storm will occur in the city, of such violence that all the lights will be extinguished. In whose house a lamp may be found burning, he is the man best fitted for the undertaking." Ibráhím Malik Bayyú was found reading the Qorán by lamp-light, and next morning he was appointed to command the expedition. He at once advanced to Bihár, and surprised Rájah Háns Kumár at the Súraj Pok'har, Bargáon. Although the Rájah

escaped to Rohtāgarh, the number of the slain was so great, that Malik Bayyū returned with fifty sers weight of sacred threads. He now occupied himself in subduing the warlike tribes of the province, and unfortunately fell at the moment of victory, his enemy Rajah Hans Kumar having been killed in the same battle. Malik Bayyū's body was brought to Bihār; and the Rājah's head and the sacred threads were buried at the foot of the hill, which still bears the name of Mund-mala.

According to the inscriptions on Malik Bayyū's shrine, he died, apparently peacefully, on the 13th Zil Hijjah, 753, or 20th January, 1353, in the second year of Firuz Shāh's reign and about a year before his invasion of Bengal.

No 35

نعمت دولت شاه جهانگیر که دادا در بهار ملک نورور
 شهنشاه جهان فیروز سلطان که بر ساغان گیتی گشت فیروز
 ملک سیرت ملک ابو نراهم که بد در دس چو ابراهیم کن نور
 امادی الحجه نکسته از دهر بدست چون سپرده از ۴۰ درس سر
 بحر و همدو پنجه سقاریع مسافر شد ملک در حنت اس روز
 خداوند اعلم حوس روی کدی آسان حساب آخری روز

1 In the time of the reign of the world taking shah (may the *mulk i nauras* be in Bihar!)

2 The king of the world Sultan Firuz who was victorious over the kings of the Universe,

3 The angelic Malik Bayyū Ilahim, who in his faith was as zealous as Abraham

4 In the month of Zil Hijjah on a Sunday of the time when thirteen (days) of the month had been in grief *

5 In the year 753 A. H., the blessed day to Paradise

6 O Lord, in Thy kindness, make the account of the last day light for him!

No 36

این معطع بهار ملک سیف دولست کز سهم تیغ او سر افکندی آفتاب
 بر عالم بفاش بود بت شکی خطاب
 بر دم بنات فناد و نهی شد رباب
 معذورم شک چو وصف آراسنی بحرب
 خورشید اگر چه لشکر سیاره را شکست
 نارنج آفتاب که یکشنبه از جهان
 چون لعل رفت در دل سنگ از برای حوای
 چون از مه معظم دی الحجه سپرده
 و رسال بعد همدو پنجه سه در حساب

1 This Jégirdar of Bihār is the Malik, the sword of the dynasty, from the point of whose sword the sun turns his head

* The poetry is bad enough, but metrical slips also occur. The metre is short *hazaj*, and the *tim budast* has been elided.

2. Like his namesake (Abraham), he broke idols, so that in the future world the title of 'Iconoclast' might be given him.

3. (He is) the warrior who breaks the ranks (of the enemies), when he arranged his ranks, Rustam fell into feverish restlessness, and Bahman lost his firmness.

4. Although the sun defeats the army of the planets, he makes at last for himself a screen of the mountains.*

5. On the day of the sun it was, on a Sunday, when, like a ruby in a stone, he (Malik Bayyú) went away from the world, in order to sleep,

6. When thirteen days had passed away from the exalted month of Zil Hijjah, and 753 years of the era.

No. 37.

درین گنبد که هست از روی معنی بقدر از گنبد افلاک برتر
 بختست شیر مردے کز نهیبش بختی شیر اندر بطن شهر
 مدار ملک ابراهیم بوبکر که تیغ از بهر حق میزد چو حیدر
 چنین لشکر کشی کشور کشائی فحیزد دوم اندر هفت کشور
 کنون چون بردرت افتاد یارب ز راه لطف بکشی برو در
 بمشک رحمت و کافور رفت کنی دیوار خاکش را معطر

1. In this dome, which in a spiritual sense has a higher value than the dome of heaven,

2. Sleeps a lion, from whose dread ... (unintelligible),

3. The pivot of the realm, Ibrahīm Abū Bakr, who wielded his sword for truth like Haidar ('Alī).

4. Such a warfare, such a conquest of realms, will not take place a second time in the seven realms.

5. O God, as he has now fallen down at Thy door, open in mercy Thy door to him!

6. Perfume the walls of his grave with the musk of Thy mercy and the camphor of Thy forgiveness!

No. 38. *The Fīrūz Shāh Inscription in the Chhotā Dargāh.* A. H. 761.

The Chhotā Dargāh of Bihar is the shrine of Badruddin Badr i 'Alām. This faqīr came from Mirat'h, is said to have spent a long time at Chātgaon, and settled at last in Bihār, where he died in 844 A. H., or 1440 A. D., the *tārīkh* of his death being بنور حق پیوست, 'he joined the glory of the Lord.' It is said that the famous Sharafuddin Munyari had invited him, but Badr delayed in Chātgaon, and only arrived in Bihār forty days after Sharafuddin's death.

The slab stands in the northern enclosure, and curious to say, has on the other side Inscription No. 6, given above. It thus contains the name

* The light of the sun is so strong that the planets are not visible; but even the sun sets and loses himself behind the mountains. So also Malik Bayyū.

of the Bengal Fīrūz Shāh on one side and that of the Dihlī Fīrūz Shāh on the other. We often find slabs with Hindú carvings on one side and Muhammadan inscriptions on the other; but I have not heard of a Muhammadan inscription having been treated so; for it is repugnant to the feelings of a Muslim to have God's name walled up. The slab is now considered an infallible cure for evil spirits of all sorts.

مجدد گشت این میمون عمارت بعد پادشاه عدل پرور
 شهنشاہ جهان فیروز شاہ کنک از آباد شد محراب و منبر
 بسعی و التماس بندہ خاص برین خطہ اندر دور دور داور
 ملک سیرت ملک کافی کفایت فہیم نامور در ہفت کشور
 گذشتہ ہفتصد از تاریخ ہجرت فزودہ بود یک ترشست دیگر
 ہمیشہ باد شہ بر تخت دولت چو نام خویش فیروز و مظفر

1. This auspicious building was renewed in the reign of the justice-fostering king,

2. The lord of the world, Fīrūz Shāh, through whom niches and pulpits [*i. e.*, mosques] flourished,

3 Through the exertion and at the request of the special slave, (who is) the Reporter (*barā*) of the District, in the time of the just king,

4. An angelic man, a noble whose guarantee is sufficient, a wise man, renowned in the seven realms.

5. Seven Hundred years have passed away of the Era of the Hijrah, and sixty-one besides.

6. May the king on the throne of power remain for ever victorious and successful, as (indicated) by his name!

The following two inscriptions are of importance for the history of the Dihlī empire.

No. 39. *The Muhammad Shāh Inscription of Bihār.* A. H. 792.

This inscription belongs to the ruined mosque in Kabīr-uddīnganj, the most northern Mahallah of the town of Bihār. The mosque has three cupolas, the centre one circular, the others octagonal. Two of its lofty minarets have fallen down.

Regarding the king, *vide* Mr. Thomas, 'Chronicles,' p. 306. The metre (long *ramal*) precludes the possibility of an error in the date.

شد بعد دولت شاہ محمد نامدار اینچنین مسجد مروج فضل باری کردگار
 این بار کرد چون خواجہ ضیا ابن علا بد رحمت ہفتصد دیگر بود دو در شمار

1. In the time of the reign of Shāh Muhammad, the illustrious, this Masjid became generally used, (by) the grace of God, the Creator.

2. When Khwājah Ziyā, son of 'Alā, erected this edifice, it was 792 after the Hijrah. (A. D. 1390.)

No. 40. *The Mahmūd Shāh (of Dihlī) Inscription of Bihār*. A. H. 799.

This inscription belongs to the *Khānqāh*, or cell, of Ziyā ul Haq, governor of Bihār, who was mentioned in the preceding inscription. The slab was found in the cluster of religious buildings known in Bihār as the Chhotā Takyah, 'the small cloister,' in which there is the tomb of Shāh Dīwān 'Abdul Wahhāb, who is said to have died in 1096, A. H.

As the inscription mentions Mahmūd Shāh as the reigning king in 799, it follows that Nuṣrat Shāh was not acknowledged as opposition king by Malik Sarwar of Jaunpūr, to whom Bihār then belonged. *Vide* 'Chronicles,' pp. 312 to 317.

کرد اندر عهد سلطان جهان محمود شاه حاکم خطه ضیاء الحق بنا این خانقاہ
مفتصد نہ با نود از سال ہجرت رفتہ بود شد تمام ابن خانقہ بادا ضعیفان را پناہ

1. During the reign of the king of the world, Mahmūd Shāh, Ziyā ul Haq, governor of the province, built this *Khānqāh*.

2. Seven hundred and ninety-nine years had passed since the Hijrah, when this asylum was completed. May it be the refuge of the weak! (A. D. 1397.)

Nos. 40 to 42. *The Mahmūd Shāh (of Jaunpūr) Inscriptions of Bihār*.
(A. H., 817 and 859.)

From the preceding inscriptions we see that Bihār, in the 8th century of the Hijrah, belonged to the Dihlī empire. With the establishment, immediately afterwards, of the Jaunpūr kingdom, it was separated from Dihlī. Bihār with Qanauj, Audh, Karah, Dalamaui, Sandolā, Bahrāich, and Jaunpur, had since 796 been in the hands of Malik Sarwar Khwājahsarā, who had the title of 'Sultān ushsharq,' or 'king of the East.' He does not appear to have struck coins, and the fact that the preceding inscription does not mention his name, confirms the statement of the histories that he did not assume the ensigns of royalty. He was succeeded by his adopted son Malik Qaranful,* whose elder brother Ibrāhīm ascended the throne of Jaunpūr in 804, under the title of Sultān Shamsuddīn Abul Muzaffar Ibrāhīm Shāh. After a reign of forty years, he was succeeded by Nāṣiruddīn Mahmūd Shāh (844 to 862), to whose reign the following three inscriptions belong.

The inscriptions do not mention Mahmūd's *kunya*; the coins (Thomas, *Chronicles*, p. 322) do not even give his first name. But as Nāṣiruddīn Mahmūd Shāh of Jaunpūr is the contemporary of, and has the same name

* This word is generally derived from the Greek *caryophyllum*, a clove; but the *Ghiyāsullughāt* derives it more correctly from the Hindī *karn*, 'ear,' and *phāl*, flower, because women and eunuchs often put a clove into the lobe of the ear. An ear-ornament, resembling the head of a clove, has also the same name. It is possible that Malik Qaranful, like Malik Sarwar, was a eunuch.

as Náçiruddín Mahmúd Sháh (I) of Bengal, care is to be taken not to confound the two.*

The first of the following three inscriptions belonged to a mosque which stood opposite to the Chhoṭá Takyah, on the opposite bank of the Adyanadí, in Bihár. The mosque has disappeared; only a large square stone platform is left, where the slab was found.

The second and third inscriptions belonged to the ruinous Pahárpúr Jámi' Masjid.

No. 40.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ * قَالَ عَلَيْهِ السَّلَامُ مَنْ بَنَى مَسْجِدًا لِلَّهِ بَنَى اللَّهُ لَهُ
بَيْتًا فِي الْجَنَّةِ ۥ

شد بتوفیق الهی و ز طقیل مصطفی مسجد جمعه بعد شاه دین برور بنا
شاه محمود ابن ابرهیم عادل شاه آنک کشور از شاهان ستاند باج نخشد برگدا
بانی این مسجد آن مسند شریعت هست کو ذات پاکش قره العین بی و مرتضا
برور و صدر جهان آن سید اجل که شد ملک و ملت دین و دولت را درو التما
کوده فرمایش بداء خیر ملک الشرق کآن مقطع داور درین خطه نصیر ابن بها
این بنا شد استوار از طاق کسری در بهار کعبه در عظمت بر رفعت بیت معمور علا
غرق ما رجب بد هشتصد و چهل هفت سال کاندربن مسجد اقامت شد بتائید خدا

In the name of God, the merciful and the clement. He upon whom be peace (the Prophet) says—"He who builds a mosque for God, for him will God build a house in Paradise.

1. By divine grace and for the sake of Muṭṭafá [the Prophet], the Jum'ah mosque was built in the reign of the faith-nourishing king

2. Sháh Mahmúd, son of Ibráhím the Just, a king who takes realms from kings, (and) gives boggars tribute.

3. The builder of this mosque is the great lawyer, who is pure in nature, the beloved of the Prophet and of Murtazá ('Alí),

4. The chief and the centre of the world, the perfect Sayyid, with whom realm and faith, religion and the royal house, take refuge,

5. (Who) ordered this building (to be erected), he the best in the Eastern (Jaunpúr) kingdom, the Jágírdár (*muqáṭṭ*), the lord of this district, Naçir ibn i Bahá.

6. This building in Bihár is stronger than the portico of Kisrá; it is a Ka'bah in grandeur, and in loftiness the edifice of sublimity.†

7. It was on the 1st Rajab, of the year 847 A. H., [25th October, 1443, A. D.] when with the assistance of God the first prayer was read (*iqdamat shud*) in this mosque.

* The Jaunpúr Mahmúd Sháhí coins generally have the word *sulṭán*, and allude to the investiture by some Khalífah.

† The phrase 'استوار از طاق کسری' in line 6 is a Hindí construction for the Persian Comparative.

No. 41.

بسم الله الرحمن الرحيم * قال عليه السلام من بني مسجد الله بنى الله له
بيتا في الجنة *

بارك الله در زمان ناصر دنیا و دین شاه محمود بن ابراهیم شاه راستین
صفدر گیاه پناه مملکت صدر کریم یافته توفیق خیر از فضل رب العالمین
مسجد جامع بنا کرد آنچنان کاندرجهان طاق بنیاد آمدش با مایه و مایه همدشین
منبر و محرابش از فرط علو مرتبه یافت آن رونق که تحسین میکند روح الامین
و من ندا از عالم بالا همی آید فرود هذه جنات عدن فادخلوها خالدين
چارشنبه بیستم هفتم مه ز ایام صیام هشتاد و پنجاه و نه بودست تاریخ از سنین ۸۵۹
در بقاء خیر او احمد همی خواند: بجان روح پاک شیخ شرف الحق والدين راضعین

In the name of God, &c., (as above).

1. Blessed be God, in the time of Nāṣiruddunyā waddīn Shāh Mahmūd, son of the righteous Shāh Ibrāhīm [of Jaunpūr],

2. The hero of the world, the refuge of the kingdom, the noble chief, who through the mercy of the Lord of the Universe has found grace to do good,

3. Built this Jāmī' Masjid in such a way, that on earth the arch of its structure dwells together with the moon and the fish.*

4. Its pulpit and niche, from the excess of the loftiness of (their) dignity, have received such a lustre that even the *Rāḥ ul Amīn* (the warden of Paradise) has approved (of them).

5. And from the upper world, the call comes continually down (to earth), 'This is the garden of Eden, enter it (and live in it) for ever.'

6. Wednesday, the 27th of the month of fasting (Ramazān) of the year 859 in the date of its erection (14th September, 1455, A. D.).

7. Ahmad (the Prophet) sincerely (*ba-jān*) desires to protect this religious building for the sake of the pure spirit of Shaikh Sharaf ul-haq waddīn.†

No. 42.

بسم الله الرحمن الرحيم * قال عليه السلام من بني مسجد الله بنى الله له
بيتا في الجنة ۱۱

مسجد جامع بتوفیق خداوند الا و ز طفیل مصطفی صاحب تبکون و جلا
شد بعد دولت شاهي که مصیت عدل او مغرب و مشرق گرفت از پشت ماهي تابما
آنکه پور شاه ابراهیم عادل سرمر از آفتاب ملطنت شاه جهان محمود شاه

* I. e., the building is so high, that it touches the moon, and its foundation is so deep, that it touches the fish, upon which the earth is supposed to rest.

† The metre is as bad as the poetry. To get out the metre, we have to read *sharf* for *sharaf*—which is Hindūstān, and have to scan *haqqa waddīn*.

.. .. .
 نزهت بیت المقدس حرمت بیت الحرام
 بندہ افضل اللہ نبشتہ بیست و ہفت روزہ شمس و پنچام و نہ تاریخ بود و سال و ماہ

In the name of God, &c.

1. The Jami' Masjid, by the grace of God the Lord, and for the sake of Muçtafi, the Lord of power and dignity,
2. Was(erected) during the reign of a king, the fame of whose justice surrounds the west and the east, (extending) from the back of the fish to the moon.
3. Namely, the son of Sháh Ibráhim the Just, the exalted, the sun of Royalty, the king of the world, Ma h m ú d Sh á h (two districts illegible).
6. The glory of the holy temple (in Jerusalem), the honor of the Haram (the temple in Makkah).....
7. The slave Fazlullah wrote this on the 27th day of the Fast, A. H. 859 (10th September, 1455, A. D)

I now bring this essay to a close. It has extended over more pages than I originally had intended. I hope in a short time to put together the collection of inscriptions belonging to the Pathán and Mughul periods, received by the Society from General Cunningham and Dr. J. Wise, to whose unwearied exertions Bengal History owes so much. In the meantime it would be well if other members also, and all such as take an interest in the subject, would send rubbings and coins to the Society; for in the absence of written histories it is only from mural and medallie remains that we can expect to gain a correct knowledge of the history of Bengal.

Table of the Independent Muhammadan Kings of Bengal, from A. H. 739 to 944, or A. D. 1338 to 1538.

		Statements of the Histories.		Ascertained Dates		Probable duration of reign.	REMARKS.
		Duration of reign.	Dates.	by Coins.	by Inscriptions.		
1	Fakhruddîn Abul Muzaffar Mubârak Shâh,.....	2 years and some months.	739 to 741.	739, 741 to 750.	none.	739 to 750	Eastern Bengal.
2	Ishiyâruddîn Abul Muzaffar Ghâzi Shâh, (son)	not mentioned.	none.	753.	none	751 to 753	Do.
3	'Alauddîn Abul Muzaffar 'Alî Shâh,...	1 y. and 5 m.	none.	742, 744 to 746.	none.	740 to 746	Western Bengal.
4	<i>A. The House of Ilyâs Shâh.</i>						
	Shamsuddîn Abul Muzaffar Ilyâs Shâh,	16 y. and some m.	none.	Western Bengal, 740, 744, 746 to 758; Eastern Bengal, 753 to 758.	none.	740 to 759	
5	Abul Muzâhid Sikandar Shâh, (son) ...	9 y. and some m.	none.	As prince, 750 to 761; 754; 759 to 761; 763 to 766; 770 to 773; 776; 779 to 783, 784 to 792.	Rajab, 770.	759 to 792	
6	Ghiyâsuddîn Abul Muzaffar A'zam Shâh, (son)	7 y. and some m., or 16 y. 5 m. 3 d.	to 775	772; 775; 776; 790 to 799.	none.	792 to 799	
7	Saifuddîn Abul Muzâhid Hamzah Shâh (son),	10 y., or 7 y., or 3 y. 7 m. 5 d.	to 785	804.	none.	800 to 804	
8	Shamsuddîn,	3 y. and some m., or 3 y. 4 m. 6 d.	to 788	none.	none.	804 to 808	

9	<i>B. The House of Rājāh Kāns.</i>					} 908 to 817
	Rājāh Kāns,	7 years.	none	none.		
10	Shihābuddīn Abul Muzaffar Bāyazīd Shah,	not mentioned.		812, 816	none	} 817 to 834
	Jalāluddīn Abul Muzaffar Muhammad Shah, (son)	17 years.	to 812	818, 821 831	none.	
11	Shamsuddīn Abul Mujaḥhid Ahmad Shah, (son)	16 or 18 years.	to 830	836	none.	914 to 850 [or to 816 ?]
<i>C. The House of Ilāḍ Shāh restored.</i>						
12	Nāḡiruddīn Abul Muzaffar Mahmūd Shāh (I),	32 or 27 years.	to 862	846	61 Sha'b'ūn, 863, 846 to 864 Zil Hijjah 863	
13	Raknuddīn Abul Mujaḥhid Barbak Shah, (son)	17 or 16 years.	to 879	873	860 (as prince), Safar, 865.	864 to 879
14	Shamsuddīn Abul Muzaffar Yūsuf Shah, (son)	7 y 6 m.	to 887	883, 884	882, 884, 885	879 to 886
15	Sikandar Shāh (II), (son ?)	2½ days, or ½ day.	none.	none.	none.	886
16	Jalāluddīn Abul Muzaffar Faḥ Shāh, (son of No. 13)	7 y. 5 m	887 to 896	886	886, 887 888, 889 beginning of 892	886 to 892

Statements of the Histories.		Ascertained Dates			Probable duration of reign.	REMARKS.
		Duration of reign	Dates.	by Coins			by Inscriptions
<i>D. The Habshí Kings.</i>						
17	Sultán Sháh-zádah Bárbak, the Eunuch	8 or 6 or 2½ m.	none	none.	none.	893
18	Saifuddín Abul Muzaffar Fírúz Sháh (II),	3 years.	to 899	893	none.	893 to 895
19	Náíruddín Abul Mujáhid Mahmúd Sháh (II), (son of No. 16?)	1 year.	none.	illegible.	23rd Rabí' .. (?)	896
20	Shamsuddín Abul-Náír Muzaffar Sháh	3 y 5 m.	to 903	896	898	896 to 899
<i>E The House of Husain Sháh.</i>						
21	'Aláuddín Abul Muzaffar Husain Sháh	27 y, or 29 y., or 29 y. 5 m.	to 927* (929?)	899, 900, 912, 914	903, 907, 908, 909, 911, 915, 916, 918, 919, 922, 923.	899 to 927* mentioned in Bá-díoní as reigning in 901.
22	Náíruddín Abul Muzaffar Náqrát Sháh, (son)	13 y or less, or 16 y.	to 939	922, 924, 927	929, 930, 938, 936, 937.	927 (929?) to 939
23	'Aláuddín Abul Muzaffar Fírúz Sháh, (III), (son)	3 months	none.	939	939	939
24	Ghiyásuddín Abul Muzaffar Mahmúd Sháh (III), (son of No. 21)—defeated by Sher Sháh,	none.	to 944, dies 945	943	941	940 to 944





JOURNAL

OF THE

ASIATIC SOCIETY.



Part I.—HISTORY, LITERATURE, &c.

No. IV.—1873.

*Note on two Muhammadan Coins.—By THE HONORABLE E. C. BAYLEY,
C. S. I.*

I have the honor to bring to the notice of the Society two fine gold Muhammadan coins which I have lately seen. They are both as yet undescribed.

The first is a gold coin of Nāṣir-uddīn Khusrāu, the usurper who ascended the throne of Dihli after the assassination of Quṭb-uddīn Mubārak in 720 A. H., and reigned a little more than four months.

The coin is in beautiful preservation and weighs about 169 grains.

It is of the same type as the silver coin, described as No. 155 of Thomas' 'Pathan Kings.' The marginal inscription is, however, complete and runs,

ضرب هذه السكة فيكسرت دهلے في سنة عشرين و سبعمائة

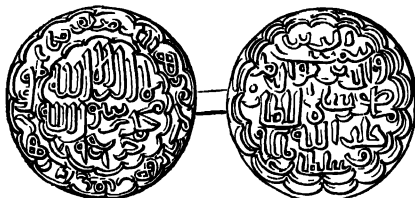
In the centre, too, of the reverse, the word preceding "الرحمن" reads clear as "ناصر" "Nāṣir ul-rahmān." The drawing of the original of Mr. Thomas' coin as given in the plates (Pl. iii, fig. 73) seems as if the latter had been imperfect at this word. The legends are, therefore, probably the same, except as to the denomination of the coin given in the margin.

The gold coin which I have above described, is in the possession of Col. J. J. H. Gordon of the 29th Regiment Native Infantry, who procured it at Peshawar.

The other coin is also a Muhammadan coin, but belongs to a later date and another mint. It is a coin of the Bengal usurper Muzaḥḥar Shāh, and

also greatly resembles the silver coin of that Monarch, figured by Marsden, (Pl. xxxv, fig. DCXCII) and attributed by him to Shams-uddín Altamsh.

Major Waterhouse has been good enough to photograph this interesting coin, and I enclose a copy of the photograph.



I give the legend as I read it in full, but there may be some doubt as to one word and as to the date, of which more presently.

REVERSE.

Muhammadan profession of faith,
or "Kalimah," with the date.

OBVERSE.

شمس الدنيا والدين ابوالظفر مظفر شاه
سلطان خلد الله ملكه و سلطنته

Margin—the names and titles |
of the four companions.

The first difficulty is as to the title "ابوالظفر." The legend in this line and that below it, is very much cramped at the end, and is with difficulty legible. I read this word therefore with some doubt, it is possibly meant for ابوالظفر.

Unfortunately, the chief doubt of the reading centres in the *date*. The numerals are preceded by two scarcely legible groups of letters, which I take to represent في سنة, and these cover the numerals, which are very ill executed. Attached to the marginal scroll on the left may be seen a triangular mark. This may be either a part of the scroll itself, or it may be intended for the cipher ٨ or 8.

On the other hand, the extreme right hand cipher, if examined by a glass, resolves itself clearly into two, and it may therefore either stand for ٦ or 6, or for • and ١, i. e., "0" and "1." The date may therefore be read as 901, or 896, indifferently.

This is unfortunate, for the date of this king is uncertain. We know but little of him. The main facts which seem to be clear are, that he murdered his immediate predecessor Mahmúd Sháh, and at once ascended the throne. After some time a rebellion arose, headed by his eventual successor 'Alá-uddín Husain. It would appear, moreover, Muzaffar Sháh was before long driven into the fortified city of Gaur, and that he held his own within this refuge for a very considerable time, defeating all the attacks of his opponents. In the end, however, they triumphed; one account says by the treachery

of his courtiers, whom he had disgusted by his cruelty ; another story is that emboldened by success he rashly hazarded a battle outside his fortification, and fell in the contest.

The popular dates assigned to this king vary very much, but it is specifically stated that his reign lasted three years and five months.

One set of dates, that most generally accepted, carries his reign as far down as 903, which would place his accession in either the beginning of 899 or end of 898, A. H. ; but, as will be seen, this is probably too late.

The only one point on which there is no doubt is that he erected a building at Gaur in 898. This is testified by the inscription published in the Society's Journal, Vol. XLII, p. 291, by Mr. Blochmann from the Gaur impression furnished by General Cunningham.

Another piece of evidence, but a less conclusive one, is the coin published by Marsden, Pl. xxxviii, No. DCCXCII, and which is dated in 899. It is attributed by Marsden to 'Alá-uddín Husain ; but if correctly attributed, as is probable, it is, I think, indirect evidence, *not* that Muzaffar Sháh was then dead, but that he was still alive in possession of Gaur. For *this* coin of 'Alá-uddín is struck at Fathábád, a mint of which I believe no other specimens exist, whereas his later coins bear the mint mark usually of "Jannatábád," the well known mint name of new Lak'hnaúti or Gaur. It is of course more than probable that 'Alá-uddín Husain, in the flush of victory and with his adversary penned up and beleaguered in a fortress, at once assumed, while himself in camp or at some obscure town, the regal style and struck coins, while Muzaffar Sháh might still have done the same inside his strong fortress.

The facts we have then are these : Muzaffar Sháh was reigning in 898. He was probably still reigning but penned up in Gaur at some period in 899. He reigned three years and five months.

All of these facts are consistent with the dates either of 896 or 901 A. H., but in either case this coin must mark *one* extreme limit of Muzaffar's Sháh's reign. My own feeling is rather to read the date as 901 A. H., resting mainly on the general assignment of a later date to him by native historians, and on the appearance of the date itself. I am bound to state, however, that such authorities as General Cunningham and Mr. Blochmann prefer to read 896.

This coin was found at Gaur some years ago, and is in the possession of E. Lewis, Esq., C. S.

Notes on Two Copper-plate Inscriptions of the Twelfth Century, A. D., recording Grants of Land by Govindachandra Deva of Kanauj.—By BA'BU RA'JENDRALA'LA MITRA.

In April last, I received from Mr. E. T. Atkinson of Allahabad two copper plates bearing Sanskrit inscriptions, together with a transcript in modern Devanāgarī and an English translation of one of them. Mr. Atkinson informed me that the plates "had been found in the village of Basāhi, about two miles north-east of the tah-īlī town of Bidhunā, in the Etāwah District. The village is in a small *kherā* or mound into which a Thākur cultivator was digging for bricks to build a house. He came on the remains of a pakkā house, in the wall of the *dālān* of which were two recesses (*lāki*), and in each of these recesses was a plate."

No. 1, the smaller of the two plates, measures 16 inches, with an average breadth of 10½ inches. It has a clasp rivetted on the middle of its upper edge to which is attached a chain of two rings of unequal thickness, holding a heavy bell-shaped copper seal. The legends on the seal are a figure of Garuḍa, the vehicle of Viṣṇu, and a conch shell, a rude imitation of the famous *pāñchajanya* conch or war trumpet of that divinity, with the name of Śrī Govindachandra Deva in the middle. The seal is peculiar to the last line of the Kanauj kings, and implies that those who adopted it were the especial followers of the Vaiṣṇava faith.

The writing on the plate extends to twenty-two lines, the last beginning at about the middle of the lower edge. The character is the well-known Kuṭila, deeply cut, and in an excellent state of preservation.

The record was first sent to Paṇḍit Bāpudeva S'āstrī, who had it deciphered and translated by one of the paṇḍits of the Sanskrit College of Benares. The transcript prepared by the paṇḍit is generally correct, and is annexed below with a few slight alterations; but the translation, being loose and periphrastic, has been replaced by another.

The subject of the inscription is the grant, to an astrologer named Ahneka, of a village named Vāsābhi, in the canton of Jīāvani, in the Etāwah district. The donor is Rājā Govindachandra Deva of Kanauj, and the date of the gift, Sunday, the 5th of the waxing moon in the month of Pauṣa, Samvat 1161, corresponding with the end of December in the year 1103 of the Christian era. The boundary of the village is given in full, and Mr. Aikman, who communicated the plate to Mr. Atkinson, identifies the place with the modern *kherā* village of Basāhi where the record was found. He says, "The only name like Jīāvani in Pargannah Bidhunā is Jiva Sirsānī, about ten miles south-east of Bidhunā, which has a large *kherā*. The name

Bándhama still exists as the name of a village about $2\frac{1}{2}$ miles east of Basáhi. Pusáni may be identified with Pusaoli, two miles south of Basáhi. For Varaválá the local paṇḍits give Belgur, two miles southwest; for Banṭhara, two miles west of Basáhi. Sávahada is apparently the modern Sabhad, $2\frac{1}{2}$ miles N. N. W. of Basáhi. All these are kherá villages with which the whole north-east of the Bidhuná Parganah appears to be studded. Tradition has it that Sahaal in the Phaphúnd Parganah, which is now but a kherá, was the site of the elephant stables of the rulers of Kanauj, and, though there is now no vestige of a wall, the villagers still point out the sites of the gates, as the Dihlí Darwázah &c."

The attesting witnesses to the gift were the high priest, the accountant general, and the warder of the palace, the conveyancer being a man of the name of Vijaya Dása, son of Paṇḍit Kuke.

No. 2 measures eighteen inches by eleven and a half. It originally had one or more rings and a seal attached to its top: but they are now lost. Its corners are broken, and the inscription, which extends to twenty-four lines, has been very much defaced by rust, making it quite illegible in some places. Owing to this the paṇḍit, who deciphered the first plate, could not make anything of the record. Careful clearing and an impression taken under a copper plate printing press, have, however, enabled me to read a good part of it, and filling up such portions as are irretrievably lost of the preamble, which is the same as in a record published in the twenty-seventh volume of this Journal, and the concluding imprecatory and commendatory verses from several land grants already published, I have succeeded in restoring the record with the exception of a few proper names of places which are not of any material importance. The portions taken from other records have been enclosed in brackets in the subjoined transcript.

The subject of the patent is the gift of two villages by Govindachandra to a Thákur of the name of Devapála S'armá, son of Thákur Udyi, and grandson of Thákur Yogi, of the Kásyapa clan. The title of the donee and his ancestors appears in its ancient form of Thakkura. The date of the gift is the third of the wane in the month of Phálguna, Samvat 1174, or just thirteen years after the first grant. The dates are given, in both cases, both in letters and figures, and so there is no doubt whatever about the accuracy of my reading.

The preamble of the first grant opens with a reference to a dynasty of which one Gáhaḍavála was the founder, and Karlla the last prince. One of the descendants, some unknown generations removed from Gáhaḍavála, was Mahiála, and after some generations Bhoja, who does not appear to have been the immediate predecessor of Karlla. Of these several names, that of Bhoja is the most important. As a sovereign of Kanauj, he must be one of the two Bhojas of the Sáran plate noticed by me in my paper "on a Land

Grant of Mahendrapāla Deva of Kanauj,"* probably the last who was the same with the "Lord Paramount" named in the Gwāliar inscription translated by me and included in my paper on the "Vestiges of the Kings of Gwalior,"† and noticed also in my essay on the "Bhoja Rājā of Dhār and his Homonyms."‡ The date of the last Bhoja of Kanauj was 885, A. D.,§ and that of the Bhoja of Gwāliar 875, A. D.,|| showing an interval of only ten years which may reasonably be supposed to have been included in a single reign. This identification would make the dynasty of Gahadavāla to be the same with that of Devasākti, which, according to my calculation, commenced in the year 779, A. D.¶

When Karlla, the last prince of the dynasty, died, cannot be ascertained; but it must have been at about the third quarter of the eleventh century. The inscription notices a revolution immediately after his death; perhaps he was destroyed by a rising of his own people, who expelled his descendants from Kanauj and made over the kingdom to Chandradeva, or at least helped him to take it.

The dynasty of the last named prince was founded by Yasovigraha, whose name occurs in a large number of inscriptions; his date, however, is nowhere satisfactorily settled.** His son Mahichandra was the father of Chandradeva. No inscription of either of these has yet been met with. Of Madanapāla, the son and successor of Chandradeva, an inscription has been published, bearing date the 3rd of the waxing moon in the month of Māgha, Samvat 1154 = 1097 A. D.†† According to the inscription under notice he was the reigning sovereign in 1103, A. D., when his son Govinda-chandra, as heir apparent, gave away the village of Basāhi.

The second inscription describes the dynasty of Yasovigraha, but makes no mention of the line of kings which preceded it. According to it Govinda-chandra was reigning sovereign or Mahārāja on the 3rd of the wane in the month of Phālguna, in the Samvat era 1174 = A. D. 1117. So he must have succeeded his father between 1103 and 1117 A. D. On the 6th of the wane in the month of Māgha, Samvat 1182 = A. D. 1125, he gave away a village in the canton of Haladoya,‡‡ and his reign may be assumed to have

* Ante XXXIII, p. 321.

† Ante XXXI, p. 391.

‡ Ante XXXII, p. 91.

§ Ante XXXI, p. 409.

|| Ante XXXIII, p. 96.

¶ Ante XXXII, p. 409.

** A summary of all the Yasovigrahas noticed in inscriptions will be found in a footnote to a paper entitled "Of two Edicts bestowing land recorded on plates of copper." Ante XXVII, p. 217.

†† Ante XXVII, p. 218.

‡‡ Ante XXVII, p. 247.

extended to the close of the third decade of the twelfth century, and probably to a much later period. His son and successor was Vijayachandra. He is said to have died in 1168 A. D.,* leaving the kingdom of Kānauj to his son Jaychandra, the last king, from whom the country passed to the Muhammadans. There are several copper plate patents extant of this sovereign. Six of them found by Captain Fell at Benares, and now in the Library of the Asiatic Society, bear dates as follow :—

Nos. 1008-3 and 6, Samvat 1233 A. D. 1175.

No. 1008-4, Samvat 1234 = A. D. 1176.

Nos. 1008-5, 7 and 8, Samvat 1236 = A. D. 1178.

Lt. Col. Caulfield's Faizábád plate,† Samvat 1243 = A. D. 1187.

His overthrow by the Muhammadans took place in A. D. 1193, which gives a period of about twenty-six years for his reign.

As the history of these sovereigns has been discussed at length by Colebrooke, Wilson, and others, and I have at present neither the time nor the inclination to write a monograph, I shall close these brief notes with a few remarks on the nature of the gift and on the various kinds of rights, taxes, and cesses which they bestowed on the donees.

The gifts, as a rule, are absolute, and to last, in the metaphorical language generally used are such occasions, "as long as the sun and moon will endure." Their resumption is also prohibited with dire imprecations. But no where is any mention made of the right of actual possession of the donor. The first impression produced on reading a copper-plate grant is that the proprietary right of the donor is conveyed to the donee, but looking to the fact that almost invariably there is a clause in the deed which says "the inhabitants and local officers, should render to the donee all rents, taxes," &c., or other words to that effect, the conclusion becomes evident that the right conveyed is, like that of the zamíndárs, limited to rents, &c., and does not extend to actual possession, which is taken for granted will rest with the tiller of the soil, except of course in the cases of unoccupied land, forests, mines, wastes, &c., which are frequently separately mentioned. This peculiarity in the land tenures of India was first pointed out by Colonel Sykes, and it shows the existence of zamíndári rights of middle men apart and distinct from the occupancy rights of the cultivators. It shows also that the right of possession did not rest with the king. He was entitled to demand revenue or *kara*, and cesses, but not to dispossess the occupant at will and pleasure. However extraordinary this may appear to persons who associate the idea of Indian sovereignty with every thing that is arbitrary and autocratic, it is a fact which is in perfect keeping with the laws of the land.

* Ante XXVII, p. 218.

† Colebrooke's Essays, II. pp. 289, 295, and 296. Journal, As. Soc., II., pp. 341. and 342; XXVII, p. 218. Ante X, p. 98.

According to the *Tattvakaumudī*, there were formerly four classes of tax-gatherers intermediate between the actual occupant on the one side and the king on the other; these were the Grāmādhyaksha, the Kauṭumbika, the Vishayādhyaksha, and the Sabhādhyaksha, and the revenue passed successively through their separate hands before it reached the king.* Whether these persons were paid officers, or owners in some sense or other, I cannot ascertain, but in the *Vivāda Chintāmani* a rule is quoted which says, "A gift of land made by the king by taking it from its proprietor through anger or avarice, or under a pretext, (*i. e.* not lawfully resumed) is illegal."†

There are laws quoted in it of the rights of squatters and lease-holders, apart from those of permanently fixed cultivators, who held the position of the ryots of the present day.‡ This becomes the more apparent from the nature of the right of the king in land as defined by Śrīkrishṇa Tarkā-lankāra in his commentary on the *Dāyabhāga* of Jimutavāhana. "When the owner of one kingdom," says he, "buys a country or the like from the owner of another, the right acquired in his purchase is that of realising revenue, which the seller had, and not anything similar to the right acquired in land by inheritance, which is also connected with land, and which is not of the same nature with the former, and cannot be produced by its transfer, the discordance being in their natures."§ Accordingly, we find in one of the Sauchi inscriptions a vassal of Chandra Gupta purchasing from one of his own subjects a piece of land, at the legal rate, for 12,500 dinārs for a Buddhist temple.||

The rights conveyed by the patents also indicate this very clearly. The first right named in the records under notice is called *bhāga* or "a share" of the produce. It is, I believe, the same with the *bhāga-jota* of the present day, in which an owner allows the cultivation of his land by a farmer on the understanding of receiving a share (*bhāga*) of the produce, the cost and labour of cultivation being borne by the latter. The share varies from four to ten-sixteenths, according to the nature of the soil and other circumstances; but it is ordinarily fixed at half the produce, which in the case of paddy is sometimes meant to include the straw, and sometimes to omit it. Owners of land are occasionally required to supply seed grain; but

* यथा हि ग्रामाध्यक्षः कोट्यधिकेभ्यः करमादाय विषयाध्यक्षाय प्रयच्छन्ति, विषयाध्यक्षः सभाध्यक्षाय, स च भूपतये इति ।

† Prasannakumar Tagore's Translation, p. 124.

‡ Ibid., pp. 130-31.

§ अत एव राज्यान्तराधिकारिणः सकाशात् अन्यभूपतिना प्रीते राज्यान्तरादौ विज्ञेयसत्त्वं सजातीयं करप्रश्नोपयोगिसत्त्वेन तस्य तत्र जायते, न तु दासप्रतिष्ठान्त-भूमादिदृष्टिसत्त्वसजातीयसत्त्वं तत्र भूमादौ तथाविधसत्त्वत्वेन तद्विराधात् तादृश-सत्त्वान्तरात्पञ्चसत्त्वात् समानजातीयसत्त्वयोर्विराधात् ।

Bharatachandrā Siromani's edition of the *Dāyabhāga*, p. 18.

|| Ante Vol. VI, p. 455.

this is not common. At the time of Govindachandra, the share was, I believe, a tenth, as I find in the inscription No. 1 the word *bhāga-kūṭaka-das'a*, which means the share (*bhāga*) for a plough-share (*Kūṭaka*) to be *das'a* "ten," the "ten" meaning either ten hundredths or one tenth. The ordinary practice of calculating by fractions of the rupee or sixteenths has, I imagine, not been adopted here, as the very next word *bandha viñs'ati* twenty or a twentieth for mortgages, would in that case mean twentysixteenths, which would be absurd. One-twentieth or twenty-hundredths—most probably the former was the rate of cess for mortgages. But whatever the rate the right was clearly limited to rent, and did not extend to actual possession.

The second right of the zemindar is named *Bhoga*, literally meaning enjoyment, but most probably intended to imply usufruct, as in the current terms *Bhogubandhak*, *Bhogalābh*, *Bhogādhikār*, *Bhogasanad*, &c., a mortgage is meant in which the article pledged is permitted to be used in lieu of interest. It might mean the actual possession and enjoyment of the land, but that cannot be the object intended by the conveyancer, for in that case he would not have described it as "payable," and enjoined the inhabitants or ryots to "render it." The condition of payment, or rendering, implies that the land was left in the possession of the ryots, and the donee was still to have some enjoyment of it. This could be effected by allowing the landlord to have the right of using it when the land was left fallow, either as field for grazing his cattle, or taking the grass from the field after the cultivator's crop had been removed from it. A right of this description is enjoyed in the North-Western Provinces to this day; and a case once came up in appeal to the High Court of Calcutta from Behar in which the zemindar claimed the right of taking grass from the field of his ryot, after the ryot had removed his crop. This is indicated in a passage in the *Vivāda Chintāmaṇī* where it is stated that "the produce of seeds thrown from one field into another by a storm or a deluge, is enjoyed by the proprietor of the field,"* *i. e.*, the produce resulting without the intervention of the ryot is due to the zemindar, even during the currency of a lease, unless otherwise provided for in the lease.

The next is *Kara*, *i. e.*, rent proper or revenue, in which a fixed amount, whether payable in money or kind, has to be rendered for the use of land irrespective of the actual produce at any given time. The standard for fixing the rate was doubtless the produce, but when the rate was once fixed, the produce was no longer taken into consideration.

The next is *Pravani kara*, or a toll on quadrivials, *i. e.*, a toll at tulpikes, it being very unlikely that a traveller was called upon to pay a toll at every cross road. The translator of the Delhi College copper-plate

* Prasannakumār Tagore's edition, p. 131.

fancies that from the mention of this tax, "it may possibly be inferrible that the impoverishment of the imperial coffers had recently given rise to a new species of fiscal exaction ;"* but the impoverishment is altogether imaginary ; there is nothing to show that Govindachandra's reign was financially a bad one, and needed any extraordinary fiscal measures for relief. On the contrary, Govindachandra and his two successors, who exercised supremacy for nearly the whole of the twelfth century, and possessed the finest and richest portion of India, including the Gangetic doab, a good portion of Oudh down to Benares, and an undefinable portion of the tract of country to the south of the Ganges and Jumna from Tikkari to Gwalior, were rich and prosperous, the most distinguished sovereigns of their times, lavish in bestowing entire villages, not unoften two, three, or more at a time, in free gift to Bráhmans, it is extremely improbable that they laboured under pecuniary difficulties. Were the difficulty to be admitted as a fact, still the question would remain, how could the bestowal of the right to raise such a tax relieve the tightness of the imperial exchequer ? To make it really beneficial, the donor should have reserved the right for himself, and not given it away to a subject.

These four forms of taxation are mentioned in the second plate, and the grant appears to be limited to the enjoyment of these, which the tenants were to contribute. In the first grant the gift is absolute, including the power of administering justice, the punishment being limited by the nature of the offence, *sadrisáparádha danḍa*. But even here the tenants are not altogether lost sight of, nor their rights annulled, for it ordains that the share (*bhāga*) for each plough, *kútuka*, should be ten or a tenth (*das'a : bhāga-kútuka-das'a*).

The right of the donee in mortgage is fixed at one-twentieth or five per cent., which is somewhat more than the stamp tax of the present day. He is authorised also to raise a tax for beggars—a poor rate—which is to be equal to a *prastha*, or four *kudavas*, which is equal to "forty-eight double handfuls ;" but whether that was required to be contributed by every tenant, or for every biggah of land cultivated, I cannot ascertain. The tax is named *agu-prastha*. A similar rate of tax is also fixed for the administration of justice *aksha-paṭala-prastha*. For the watch and ward of the village, a similar rate is likewise fixed. It is called *pratihāra-prastha* or a *chaukidári* tax, and in some villages of Bengal, it is still current, though the measure of corn given is different. Royalties are also fixed for mines (*ákara*), collection of fragrant grass, meaning evidently the wild *Bená* grass or *Khas khas* (*turushka-danḍa*) ; wild tree-cotton (*dhara*) ; reeds for mat-making (*kaṭa*) ; and trade in precious metals and jewels, collectively called *hiranya* or gold. In the translation of the Inscription published in the twenty-seventh volume of this Journal (p. 249), the word *turushka-danḍa* has been rendered into

* Ante XXVII, p. 248.

"Mahomedan amercements," the translator suggesting that it implies that "the encroachment of the northern invaders were gaining head, and that their dominion was becoming to be recognised;" but I cannot accept this version as correct. It assumes the presence in Etawah of such a Moslem population as would be worth taxing; and that is far from being probable. The word *turushka* doubtless means a Turk or a Moslem, and it is undeniable that the incursions of Mahmúd Ghaznavi did leave some of his followers scattered in different parts of India, but they did not make up such a population in villages as to make judicial fines imposed on them of any material value. At any rate such fines do not by any means indicate Moslem sovereignty in India, nor does their imposition by Bráhmans under the orders of a Hindu king in the year 1103 imply its extension. It may be added, that the right of administering justice carries with it that of fining, and the donee who got the right, enjoyed the fines from Hindu and foreign offenders alike, and a special mention of "Mahomedan amercements" was not at all needed. But the most important argument against the theory appears to me to be the position which the word *turushka danda* occupies in the text. It is preceded by *ákara*, "mine," and followed by *dhara*, "tree cotton," and *kaṭa* "mat reed," and one naturally expects it to be the name of some article of produce; and this is supplied by the old meaning of *turushka* "an aromatic substance," added to *danda*, "a stick," an aromatic reed. In the western parts of the Burdwan district, where the khas-khas is common, a royalty is to this day charged by zemindars for permission to cut it.

Transcript of Inscription No. I.

१० ॐ नमो भगवते वासुदेवाय ॥

तमायं सर्वदेवानां दामोदरमुपास्यते ।

चैलाकं यस्य वक्त्रोवाक्रोऽङ्गान्स्थं बलिवयो ॥ १ ॥

वग्ने गावडवालाख्ये बभूव विजयो नृपः ।

महिषालघुतः श्रीमान् नलनाभागमग्निभः ॥ २ ॥

याते श्रीभोजभूये विबुधवरबधूनेचसीमातिथिलं

श्रीकर्णं कीर्तिमये मतवति च नृपे. आत्यये आशमाने ।

भर्तारं यं धरियो विदिवविभुनिभं श्रीतियोगादुपेता

चाता विश्वस्य पूर्वं समभवद्विह स आपतिचन्द्रदेवः ॥ ३ ॥

द्विषतिश्चतिष्ठतः सर्वान् विधाय विवशान् वग्ने ।

कन्याकुलोः करोद्राजा राजधानीमनिश्चिताम् ॥ ४ ॥

तमाजनि द्विषद्विष्ठापतिदक्षिणिः शोणोपतिर्भेदनपाल इति प्रविष्टः ।

यैनाग्निथल वज्रः समरप्रवन्धाः सङ्गतिप्रवृत्तश्चक्रवन्धवन्धाः ॥ ५ ॥

तस्मादजायत नरेश्वरहन्धवन्धपादारविन्दयुगलो जलितप्रतापः ।

शोषीपतीन्द्रनिष्ठको रिपुवृद्धभङ्गी मोविन्दचन्द्र इति विभुतराजपुत्रः ॥ ६ ॥

संवत् सप्तमैके एकचतुर्गतरमताम्यधिके पौषमासे शुक्लपक्षे पञ्चम्या रविदिने
संवत् ११६१ पौषसुदि ५ रवौ ॥

अथेहासतिकायां सकलकल्याणकारिणां यमनायां ज्ञात्वा यथाविधानं मन्त्रदेव-
व्यवसिन्धुभूतपितृसुप्रेथिला । स्वयं भट्टारकं सर्वकर्तारं भगवन्तं भित्तिं विशाधारं वासुदेवं
समभ्यर्च्य उतवर्षं ज्ञत्वा । जीवावनीपतेशायां वसभीषासे समस्तमङ्गलमजनपदान् सम्मो-
धयति । यथा ग्रामोऽयं मया क्षेत्रवनमधूकाद्याकाशपातालसहितः सहस्रापराधदण्डः*
भागकूटकदम्, बन्ध, विभ्रति, जगप्रस्थाक्षपटलप्रस्थ, प्रतीहारप्रस्थाकर, तुषष्पादण्डधर-
कर, शिरष्पसर्वादायसंयुक्तः । पूर्वस्थां बान्धमौक्तधामः पश्चिमायां वडम्बलाधामः दक्षि-
णस्थां पुसेलीधामः उत्तरस्थां सावदधामः एवं चतुराष्टादिविशुद्धः । मातापितृराक्षन्ध
यमःपुष्पविहङ्गये जलबुधुदाकारं जीवितं दानभोगफलं लब्धं ज्ञात्वा । वडम्बलादिने
गौतमगोत्राय गौतम, अविनाथ, अक्षिरथ, विप्रवराय मेमेपौत्राय कुक्षेपुत्राय ज्योतिर्विदे
ब्राह्मणशास्त्रेकाय महाराजपुत्रमीमङ्गोविन्दचन्द्रदेवेन उत्तरायणसङ्क्रान्ते कुम्भपूतेन हस्तो-
दकेन चन्द्रार्कं यावत् शासनत्वेन प्रदत्तः ।

ये यास्यन्ति मज्झीहते मम कुले किंवा परस्मिन् पुर-
लोचनेष्व मयाञ्जलिर्विरचितो नादेयमस्मात् कियत् ।

दूषोमात्रमपि स्वधर्मनिरता दत्तं मया पाष्यतां

वायुर्वास्यति तप्यति प्रतपनः श्रुत्वा मुनीनां वचः ॥ १ ॥

वडभिर्वसुधा भक्ता राजभिः सगरादिभिः ।

यस्य यस्य यदा भूमिस्तस्य तस्य तदा फलम् ॥ २ ॥

सदत्तां परदत्तां वा यो हरेत वसुध्वराम् ।

स विष्ठायां ह्रमिर्भूला पितृभिः सच मज्जति ॥ ३ ॥

भूमिं यः प्रतिगृह्णाति यस्तु भूमिं प्रयच्छति ।

तावुभौ पुण्यकर्माभौ नियतं स्वर्गवासिनौ ॥ ४ ॥

तद्भागानां सप्तक्षेत्रे वाजपेयशतेन च ।

मवां कोटिप्रदानेन भूमिर्हर्ता न श्रद्धान्ति ॥ ५ ॥

लिखितं पुरोहितश्रीजागूकमेवमकश्रीप्राज्ञप्रतीहारश्रीगौतमी रवां सकल्य पण्डितः
श्रीकृष्णवज्रविजयदासेनेति ॥

Translation of No. 1.

Om ! Salutation to the glorious Vāsudeva.

1. I adore Dāmodara, the first among the Gods, the three folds of skin on whose belly are said to be the three worlds in his lap.

2. In the dynasty of Gāhaḍavāla was born the victorious king, comparable to Nala and Nabhāga, the son of the auspicious Mahiāla.

3. When king Bhoja had become an object of sight to the charming wives of the gods, (i. e. died); when the career of king Śrī Karṇa had come to a close, when there was a revolution, then Chandradeva became king. On gaining him, who was like the lord of heaven, for her husband, earth was gratified. He was a protector of the universe.

4. Having brought under subjugation all irrepressible and inimical kings, the sovereign established his reproachless metropolis at Kānyakubja.

5. Of him was born the renowned of earth, Madanapāla—a lion to the inimical elephant Ilāpati, (king of Ilā), who engaged himself in frequent warfare,* and made the trunks of his decapitated enemies dance (in the battle field).

6. Of him was born the celebrated prince Govindachandra, whose lotus-like feet were adored by hosts of mortal sovereigns—a prince of refulgent might, the ornament of mankind, and the disturber of the enjoyment of his enemies.

On Sunday, the 5th of the waxing moon, in the month of Pausa, of the Samvat year one thousand one hundred and sixty one, Samvat 1163, Pausa, 5th Sudi, Sunday.† Having this day bathed here at Asatika,‡ on the sin-destroying Yamunā,—having offered libations of water to the tutelary divinities, sages, (rishis) men, animals and manes,—having worshipped the sun, the sovereign and glorious lord of all, Ś'iva, and the asylum of the universe Vāsudeva,—having duly made offerings to the fire (the prince) thus addresses all the respectable inhabitants of the village of Vasabhi, in the district or circle (*Pattana*) of Jiyāvanī. This village with all its fields, and orchards of Madhuka and mangoes, together with the sky over it and the region below it, as also the power of administering justice, the right to a tenth for every ploughshare, to a twentieth on mortgages, to royalties or shares (*prastha*) of corn, for beggars, justice, watch and ward, mines, aromatic reeds and gold, along with all other,—the village having on its East the village of Bandhamauni; on its West the village of Vedabhala; on its South the village of Pusāni; and on its North, the village of Sāvahada, thus bounded on four sides—for the increase of virtue and good name of my parents and myself, and knowing life to be as impermanent as a bubble on water and the value of wealth to lie in charity and enjoyment, has been granted as a śāsana for the period of the sun and the moon to the astrologer Brāhmaṇa, Ahneka, son of Kulye, and grandson of Meine, of the Bahvrich Śākhā (branch) of the Gautama clan (gotra), having Gautama, Avitatha, Angiras'a for his threefold *Pravara*, by Govindachandra Deva, son of the Mahārāja, on the winter solstitial conjunction (of the month of Pausa and Māgha) with water held in his hand, and purified by Kus'a grass.

1. With folded hands this is my prayer to all future sovereigns of my and other dynasties, that they should never take any tribute from this village—not even a blade of durba grass. Those who wish to do their duty should, obedient to the mandates of sages, preserve intact my gift, (as long as) the wind blows and the sun continues to shine.

2. This earth has been enjoyed by many kings, including Sagara and others. To whomsoever belongs the earth for the time being, he enjoys the fruit (of such gifts).

3. Whoever robs earth, whether given by himself or others, becoming a maggot, sinks with his parents into ordure.

4. Both he who accepts land and he who grants it, are equally meritorious, and they dwell eternally in heaven.

5. The alienator of land-grants cannot expiate his crime even by (dedicating to

* The word *prabandha* means both continuous action and a treatise. The latter would imply that the king composed some treatises on tactics, but the second clause would be more in keeping with the former meaning which has been adopted in the text.

† The repetition is due to the circumstance of the date being given first in words and then in figures.

‡ Probably the name of a ghat or a village on the Yamunā.

public use) a thousand tanks, by (performing) a hundred Vājapeya rites, and by giving away in charity ten million heads of cattle.

This was written by Vijayadása, son of the Pandit Śrī Kuke, with the consent (or in the presence ?) of the family priest Śrī Jáguka, the chief accountant (*Mehatta-ka*)* Śrī Bráhmaṇa, and the warder (*Pratihára*) Śrī Gautami.

Transcript of Inscription No. II.

- १ (सति ॥ चक्रुषोऽन्वयैकुष) कषपीठसुतकरः । संरक्षः सुरतारणे स त्रियः
(नेयसेसु) वा ॥ १ ॥ आसीदभीतद्युतिवंशजातच्छापाक्ष(मासाद्यु दिवं गताद्यु ।
साक्षाद्विषया(निव
- २ भूरिधाया) नाया (यशोविष) इत्युदारः ॥ १ ॥ तत्सुतोऽभून्महीचन्द्रचन्द्रचाम-
निभं निजम् । येनापारमकूपारपारे व्यापारितं यशः ॥ तस्याभू(ननयो नयैक-
रसिकः ज्ञानद्विषयलो
- ३ विध्यलोदतवीरयोध)तिमिरः श्रीचन्द्रदेवो नृपः । येनोद्धारतरप्रतापशमिताशेष-
प्रजोपद्रवं शोभद्गाधिपुराधिराज्यमसमं दोर्विज्र(मेणार्जितम् ॥ तीर्थानि काशि-
कुम्भिकोत्तरकोश—)
- ४ सेन्द्रस्यानीयकानि परिपालयताभिगम्य । हेमात्मतुल्यमनिर्घं ददता द्विजेभ्यो येना-
क्षिता वसुमती भूतभक्षुछाभिः ॥ तस्यात्मजो मदनपाल इति चित्तीन्द्रचूडा(महि-
र्विजय)ते नि—
- ५ (अनोचचन्द्रः । यस्याभिषेककलशोत्तमिः पयोभिः प्रक्षालितकुलिरजःपटलम्बरि-
व्या ॥ यस्याधीद्विजयप्रयागसमये तुङ्गाचलोच्चैश्चलन्माद्यक्षिपद्रजसा + भरध—
- ६ (स्यमहीमण्डले । चूडारत्नविभिन्नतालुमलितस्यानाद्यु)ङ्गासितः श्रेयः पेषवशादिव
चक्षमसौ श्रोत्रे निखीनामनः ॥ तस्यादजायत निजायतवाङ्मवक्षिपन्मावक्षन्वराङ्गम-
- ७ (जो नरेन्द्रः । सान्द्रावृतद्रवमुचां प्रभवो गवां यो) गोविन्दचन्द्र इति चन्द्र इवास्तु-
राशेः ॥ न कश्चनलज्जमन रक्षन्मांलिङ्गु दिक्षु गजानाञ्चवक्षिणः । ककुभि-वध-
भुरक्षमुवक्षन्—
- ८ (प्र)तिभटा (रज यस्या) घटा गजाः ॥
स्यार्थं स(मक्षाराञ्चक्रसंघे)वितचरतः परममहारकमक्षाराजाधिराजपरमेश्वर-
परमसाधेश्वरनिजभुजोपाजितभीकन्यकुजाधिपत्य
- ९ (श्रीच)न्द्रदेवपादानुधातपरममहारकमक्षाराजाधिराजपरमेश्वरपरमसाधेश्वरश्रीमद-
नवाक्षदेवपादानुधातवरममहारकमक्षाराजाधिराजपरमेश्वर—
- १० परमसाधेश्वरश्रीमन्नोविन्दचन्द्रदेवो विजयी () निवासिनो
निबिज्जवनपदानुगतानपि च राजराश्रीयुवराजसन्निपुरोहितप्र—

* I take this word to be the ancient form of the Uriya *Māhanti* and the Bengali *Māyiti*, an officer whose duty is to keep accounts.

११ तीहारसेनापतिभाष्णागरि (कांक्षपट) लिङ्गभिषङ्गनैमिषिकान्नापुरिकदूतकरितुरग्रव-
तनाकरस्थानगोकुलाधिकारिपुष्पानाज्ञापयति (बोधयत्यादिभू—

१२ ति च ।

यथा वि(दितसक्तु भ)वतां यथोपरिस्थितधामौ सजलस्यसौ सलोचलवरा-
करौ समत्स्याकरौ समर्गोपरौ समधूकाधवनवाटिकाविटपटलच्युतिगो—

१३ (चरपर्यन्तौ सोध्वा)धस्तुराघाटविग्रहौ स्वसीमापर्यन्तौ चतुःसप्तत्यधिकैकादशशत-
संवत्सरे फास्युने भासि कल्पपत्रे तृतीयायां तिथौ चक्रतोऽपि संवत् ११७४ फास्यु

१४तीरसमावासेन मन्त्रपूतोदकेन स्नात्वा विधिवत् मन्त्र-
दे(व) मुनिमनुजभूतपिण्डगणाक्षरपथिला तिमिरपटलपाटनपटुमहसमुष्णरोषिषमुप-
स्थायौ(षधिपतिग्रह—

१५ लोमश्वरं समभ्यर्च्य विभुवननातुर्व्यासुदेवस्य पूजां विधाय पायसेन हविषा हविर्भुजं
ऊला मातापिचोरात्मनश्च पुण्ययशोऽभिष्टब्धे काश्यपगोत्राय काश्यपाचार्यनैभु—

१६ वप्रवराय ठक्कुरश्रीयोगिपौत्राय ठक्कुरश्रीउदैपुत्राय ठक्कुरश्रीदेवपालशर्मायै ब्राह्मणा-
यास्त्राभिर्गोकर्णकुण्डलतापूतकरतलोदकपूर्वमाचन्द्रार्कं यावत् (शासनी—

१७ कृत्य) प्रदत्ताविति मत्वा यथादीयमानभागभोगकरप्रवणिकरप्रभृतिष्वर्वादायानाज्ञा-
विधेयीभूय दास्यथा ॥

भवन्ति चात्र स्तोकाः ।

भूमिं यः प्रतिगृह्णाति यस्य भूमिं

१८ प्रयच्छति । उभौ तौ पुण्यकर्माभौ नियतौ स्वर्गगामिनौ ॥ १ ॥ शङ्खं भद्रासनं चर्च
वराश्चा वरवारणाः । भूमिदानस्य चिह्नानि फलमेतत् पुरन्दर ॥ २ ॥ सर्वमेतान्
(भाविनः पा—

१९ र्थि)वेन्द्रान् भूयो भूयो याचते रामभद्रः । सामान्योऽयं न्यर्त्तसेतुर्वपाणाङ्गालो कालो
पालनीयो भवद्भिः ॥ २ ॥ वज्रभिर्व्यसुधा भुक्ता राजभिः समरादिभिः । (यस्य यस्य
यदाभू—

२० मिक्ष)स्य तस्य तदा फलम् ॥ ४ ॥ सुवर्णमेकं गामेकां भूमेरप्येकमङ्गुलम् । चरच्चरक-
मात्रेति यावदाभूतसंभवम् ॥ ५ ॥ तडागानां सप्तशेषाप्यश्वमेधशतेन च । (गर्वा कोटि-

२१ प्र)दानेन भूमिर्धनो न श्रूयति ॥ ६ ॥ स्वर्दत्तां परदत्तां वा यो चरेत् वस्तुनराम् । च-
विद्वत्तां क्षमिर्भूला पित्रभिः सप्त मज्जति ॥ ७ ॥ वडिर्वर्षसप्तशशि स्वर्गे वसति भूमिदः ।

२२ चाब्देना चानुमत्ता च तान्वेव नरके वसेत् ॥ ८ ॥ वारिहीनेश्वरखेपु शृङ्गाकोटर-
वासिनः । कल्पसर्पाश्च जायन्ते देव (ब्रह्मलक्षारिणः ॥ ९ ॥ यानीच दत्तानि

२३ पुरा) नरेन्द्र दानानि धर्मा(ययग्र)क्षराणि । निर्मास्यवान्प्रतिमानि तानि को नाम
साधुः पुनराददीत ॥ १० ॥ वाताभविभममिदं वस्तुधा(धिपत्यमापातमाचमधुरा

२४ विष)योपभोगाः । प्राणा(सुषुप्ता)जलविन्दुसमा मराणात्मनो सखा परमसो परलोक-
यान ॥ करणिकोक्ततन ठक्कुरश्री

Translation.

1. Let this be auspicious. May that agitation at the commencement of his dalliance with S'ri, when her hands rolled about on the neck and shoulders of eager and lustful Vaikuṇṭha, be to your prosperity !

2. When the line of protectors of the earth, born of the race of the ungenial-rayed orb (the sun), had departed to heaven, there lived *one* of the name of Yasovigraha, the munificent, who, in the plenitude of his effulgence, was like the sun himself.

3. His son was Mahichandra, whose glory, resembling the light of the moon, was spread wide by him beyond the sea.

4. Unto him was born a son, the king S'ri Chandradeva, the lover of polity, the discomfiter of hosts of enemies, the dispeller of the gloom of impatient, heroic warriors, by whose glorious majesty was repressed the revolts of the subjects of the unrivalled great kingdom, of auspicious Gādhipura,* which was earned by the valour of his arms.

5. Repairing, as a protector, to Kās'i, Kuska, Uttara Kos'ala, Indrasthāna, and other places of pilgrimage, he marked the earth by the performance of a hundred *tulā* rites, in course of which he repeatedly gave to the twice-born his own weight in gold.†

6. His son was Madanapāla: that crest-jewel of the lords of the earth flourishes as the moon of his race. By the waters, which sparkled in jars at his coronation, the earth was washed clean of all the sinful dust of this iron age.

7. When he went forth to conquer, on the earth sinking under the over-powering weight of the foot-falls of his maddened and careering elephants, high as lofty mountains, the serpent Śeṣha, crushed as it were by it, and having its crest-jewel fractured and thrust down into its bleeding mouth, for a time hid its face in its folds.‡

8. From him descended the king Govindachandra, even as the moon issued forth from the ocean. His long arms, extending like creepers, tied and checked all elephant-like upstart kingdoms, and he was the source of thick fluid-nectar-sprinkling eloquence.§

9. His numerous elephants could nowhere in the three quarters find worthy tuskers that could fight with them, and so they repaired to the quarter of the wicklor

* Ancient name of Kanauj.

† The ceremony is a very costly one, but it is not uncommon. Within the last ten years it has been several times celebrated in Calcutta, and in course of it not only gold, but silver, rice, paddy, sesamum seed and other articles were weighed against the donor, and presented to Brāhmins. The *Dānakhaṇḍa* of Hemādri, now in course of publication in the *Bibliotheca Indica*, contains a full description of the details of this rite.

‡ It is commonly believed that certain species of serpents bear very bright jewels on their heads; Śeṣha, the king of serpents on whose head rests the earth, according to Paurānic cosmogony, has the largest jewel.

§ If the word *gavaya* be taken in its ordinary acceptation of kine, the meaning of the phrase would be "the source (whence men obtained) kine which gave thick, sweet milk."

of the thunderbolt (East) where the lord of Abhramu* (Airāvata the elephant of Indra) was their only rival.

The same Govindachandra Deva, whose feet are profoundly adored by hosts of sovereigns, the highly revered,† the great king over great kings,‡ the supreme lord,§ the devout worshipper of Ś'iva,|| the sovereign of the three classes of kings, viz. As'vapati, Gajapati and Narapati,¶ master (Vāchaspati) of all knowledge and logic, successor of the highly revered the great king over great kings, the chief lord, the devout worshipper of Ś'iva, Ś'ri Madanapāla Deva, who was the successor of the highly revered, the great king over great kings, the supreme lord, the devout worshipper of Ś'iva, Ś'ri Chandra Deva, the sovereign who, by his arms, carved the happy kingdom of Kānyakubja, reigns supreme.

He commands, acquaints and enjoins the inhabitants of(?) and those who have come thereto from other places, as also kings, queens, heirs-apparent, ministers, priests, warders, (prithivā) generals, treasurers (bhāṇḍāgārikas) justiciaries (akṣhapatikas) physicians, astrologers, guardians of female apartments (or dwellers of the zenāna,) envoys, and owners of elephants, horses, towns, mines, commons, and herds of cattle: Be this known unto you, that after bathing in water consecrated by mantras, after offering according to law water to mantras, gods, sages, mortals, elements and manes, after paying due adoration to the fiery light (sun) whose rays are potent in dispelling dense darkness, after worshipping the crescent-crowned (Ś'iva), after performing puja to Vāsudeva, the preserver of the three regions, after offering oblations of frumenty and clarified butter to the partaker of butter (fire), for the promotion of virtue and fame of myself and of my mother and father, I have, by this patent, with water held in my hand and consecrated with Kusa grass, for the period of the duration of the sun and moon, bestowed on the third of the wane, in the month of Phālguna, in the year of Samvat one thousand one hundred and seventy-four, (in figures) Samvat 1174 Phalg., the two above written villages, together with their soil and waters, their iron and salt mines, their fisheries, pits and salt fields, their orchards of mango and madhuka trees, their gardens, topes, grass fields and pasturages, including everything above and below,

* Name of the mate of Airāvata.

† Paramabhāṭṭāraka. In Sanskrit dramas bhāṭṭāraka means a king, but in ordinary language a revered personage is generally implied.

‡ Mahārājādhirāja equivalent to the Arabic *sultān us-salāṭīn*. The term may be split into two—Mahārāja and adhirāja "great king, and paramount sovereign."

§ Parama=supreme and īvara=lord or god. The epithet has been loosely rendered into Emperor in the translation of the Delhi College plate (xxvii p. 249).

|| Parama-Māhā-īvara. In the Bonares inscription of Col. Stacy, it is placed in opposition to parama vaishṇava, some of the princes named being parama māhes'vara, others parama vaishṇava. The long ā after m shows that the word is a derivative and refers to Mahes'vara or Ś'iva. A sectorial meaning may be objected to on the ground of the seal having the Vaishṇava emblems of Garuda and conch-shell, indicating that Govinda was a Vaishṇava. But the expression of equal respect for both Ś'iva and Vishṇu is not uncommon.

¶ Evidently intended for some tributary kings. The Rājās of Orissa used to call themselves Gajapatis; those of Talingānā and Karnāṭa bore the special title of Narapati, and some of the Burmese monarchs were As'vapatis; but it is not at all likely that any of these bore allegiance to the kings of Kanauj. Vide ante xxvii, p. 24.

with their four abutments well defined, and within their boundaries, on the Bráhmaṇa Ṭhakkura, Devapála Ś'armá, son of Ṭhakkura Udai; and grandson of Ṭhakkura Yogi, of the Kás'ynpa clan (*gotra*) and Kásyapására-naidhu sept (*pravara*). Knowing this you should comply with his orders, and render unto him all dues, shares, rents, tributes, quadrivial tolls, &c., whatever have to be given.

On this subject are the following ś'lokas :

1. (The same as the 4th ś'loka of the first grant.)
2. A conch shell, a throne, an umbrella, choice horses, and excellent elephants, Purandara, are the royal insignia, which constitute the reward of giving away land.
3. Rámachandra repeatedly intreats all present and future lords of earth (to bear in mind) that this bridge of virtue (the granting of lands) is common to all sovereigns, and should be preserved by you at all times.
4. (Is the same as the 2nd of the first grant.)
5. He who robs a gold piece (*suvarṇa*), a cow, or a finger's breadth of land, dwells in hell until the dissolution of the universe.
6. (The same as the 5th of the first grant.)
7. The same as the 3rd of the first grant.
8. The donor of land dwells in heaven for the space of sixty thousand years; the resumer, and the abettor thereof, are doomed to abide in hell for a like period.
9. The resumers of lands dedicated to Gods and Bráhmans, become dwellers in arid wastes devoid of water, and dry hollows in trees, and are born as black serpents.
10. All the gifts of former kings are productive of virtue, wealth, and fame,—how can he, who claims the name of goodness, resume them which are to them but as emblems of vomited food?
11. Sovereignty is like unto clouds impelled by wind, (*i. e.* inconstant), worldly pleasures are sweet only for the moment, the life of man is but a drop of water at the point of a blade of grass; virtue verily is the only great friend for translation to a future world.

By the Kayastha Ṭhakkura Ś'ri—

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*A Metrical Version of the opening Stanzas of the Prithirāj Rāsaṁ, with a critical commentary.—By F. S. GROWSE, M. A., B. C. S.*

"Manuscripts are in general grossly incorrect; and a familiarity with the metre will frequently assist the reader in restoring the text where it has been corrupted."

*Colebrook, on Sanskrit and Prakrit Poetry.*

The following version of the opening Stanzas of Chand's great poem does not lay claim to any poetical merit. It simply professes to be a close and accurate reproduction of the original, so far as the difficulties of the text allow, in readable and intelligible English. Occasionally the exigencies of rhyme and metre have necessitated some slight expansion or curtailment; and in a few passages the *exact* turn of expression has been deliberately abandoned, either because there was a doubt about the reading, and therefore a little vagueness was preferable to what might turn out to be mistaken accuracy, or because a rigid adherence to Hindi style would have had a forced and unnatural effect, and to that extent have misrepresented the original. But throughout, the translation is line for line, not unfrequently word for word; the connection of ideas, not always easy to trace, has been carefully studied and faithfully preserved; and not a word *materially* affecting the sense has anywhere been either omitted or inserted.

These, it must be admitted, are rather the merits which should characterize a prose translation; and as a literal rendering of these very same stanzas has already appeared in the last volume of the Society's Journal, the present version might be hastily condemned as a mere work of super-erogation. The rendering to which I refer is therefore appended in a running foot-note; the words to which exception is taken as being (in my opinion) specially incorrect being printed in italics; and the text is inserted above, in order that the correspondence, or otherwise, of the one with the other may be rapidly apprehended. For other reasons it was desirable that such comparison should be made; though it may be added that the present metrical version would never have been attempted but for the opening sentence of the preface to the prose translation, which fathers upon me a retraction which I am not conscious of having made.

In my reprint of the text I have for the sake of the metre corrected the copyist's errors of spelling in many places where without such correction the lines could not possibly be scanned. It is incredible that Chand himself was guilty of these false quantities, since in one of the verses which I translate, it will be seen that he specially prides himself upon his accurate knowledge and observance of the laws of prosody. The alterations, which affect the sense, are very few in number, and are all fully explained and defended in my running commentary.

I. प्रथम साठक बंद ।

आदि प्रमत्त नम्य मुखं वानीय वंदे परं ।

सिद्धं चारन चारयं वसुमती लक्ष्मी चरनाग्रं ॥

तमगुण तिष्ठति ईशं दुष्ट दहनं सुरनाथ सिद्धिदं ।

धिर चर जंगम जीव चंद नमयं सर्वैष वरदानं ॥ १ ॥

- I. Bowing low before my master, I the queen of speech entreat,  
And the world-supporting serpent and great Vishnu's holy feet.  
Then the perfect, sin-consuming god of gods that awful power,  
Life of man and life of nature, I the poet Chand adore.

Thus after due mention of his Guru, the poet addresses his invocation to Sarasvati, Sesh-nag, Vishnu, and Mahādeva, the first of these four divinities being clearly indicated by her title of Vāni. Half of the second line is difficult, but if translated literally, would I believe stand thus, "The supporter of the weight of creation, that is, of the world," meaning Sesh-nāg. It can scarcely be doubted that *sishtam* is a corruption of *srishtam*, 'created,' not of *sreshtham*, 'the best' or 'highest;' for the substitution of *i* for *ri* is quite according to rule, as in *siāla*, 'a jackal' for *srīgāla*, but I know no instance of the substitution of *i* for *re* or *f* for *fh*. In the third line, the words *tama-guna* indicate Mahadeva, who is lord not 'of vice and of virtue,' but of the quality (*gun*) of darkness (*tama*). In *siddhi-srayam* the first part of the compound may mean 'success,' or may allude to the eight Siddhis, Rasollāsa, Tripti, Sāmya, Tulyalā, Visokā, &c., the constituents of perfection; and adopting the latter view I translate by 'perfect.' In the fourth line, I have corrected the unmeaning word *Chandana-mayam* by the simple process of division into *Chanda namayam*, 'I Chand reverence.' In the first half of the line, *achara* should probably be read for *chara*; for certainly the intention is to represent the god as the life both of sentient and insentient creation.

II. वयूषा बंद ।

प्रथम सुसंगम मूल भुति वीथ ॥

भुतिवत्य जल सिंचय द ॥

I. The prose translation :

"First reverently bowing, bowing, the poet adores the feet of the Gurus. Taking refuge at the feet of the highest, the afforder of support, the husband of the opulent Lachhi; who stands the lord of vice and of virtue, consuming the wicked, the lord of heaven, blessing with success; who is as sandal-wood to the life of living beings moving on the earth, lord of all, bestower of blessings."

II. The prose translation :

"First the very auspicious root is to be celebrated. Irrigated with the water of the truth of tradition, religion like a fair tree with one trunk sprung up, with thrice six branches rejoicing the three worlds. Leaves of various colours, leaves like mouths there were. Colour of flowers and weight of fruit it had, speech unfailing, princely, rejoicing with fragrance the sight and touch, *āsan* tree of hope to the parrot-like poet."

सुतस एक वर भव्यं उभयो ॥  
 त्रिवट साय रक्षिय त्रिपुर ॥  
 वरन पन मय पन सुभ्यो ॥  
 कुटुम रंग भारस सुफल ॥  
 उक्ति अलव असोर ॥  
 रस दरसन पारस रमिय ॥  
 आस असन कवि कीर ॥ १ ॥

- II From the seed of Revelation,  
 Watered by Law divine,  
 Sprang with thence six spreading branches  
 Faith, a straight and goodly pine,  
 Each leaf a lettered sign  
 Rich in fruit of lovely colour  
 And homed flowers of song,  
 Sweet to taste, to see and handle,  
 For the poets, patriot throng \*

In the first line I have divided the unknown word *Sruta viya* into *Sruta viya*, *Sruta* being the highest Revelation as distinct from *Smṛiti*, mentioned in the next line, divine Law or Tradition *Viya*, if allowed to stand, is of course 'seed'; but it might be better to read *boya*, 'to be sown,' the difference between the two words in Nagari writing being almost imperceptible. The fifth line is probably corrupt, but *baran* certainly means not 'colour,' but 'letters of the alphabet,' which, according to the *Mīmāṃsā* Philosophy are supposed to be eternal and immutable. In line 7 *amir* is not the familiar Persian word meaning 'a noble,' but is for *amrit*, 'nectar.' In the last line the word *as* is a little doubtful, but *āsan* unquestionably means simply 'eating.'

### III. हयै ।

प्रथम कीय मगल प्रसान । निगम संपूजय वेद धुर ॥  
 त्रिगुण साय चिह्न चक्ष । वरन लम्बो सु पन कर ॥  
 लक्ष्य भव्य उदरिय । सन फूलो जु अब दिशि ॥  
 कर्म सुफल उदयन । अमृत सुशृण मध्य वसि ॥

### III The prose translation

"First having indeed proclaimed a blessing, having honoured the sacred writings, whose beginning is the Veda, whose three fold branches in all four directions are possessed of colour and leaves like letters. Religion, having sprouted out through the bark, flowered fair in all four directions its fruit, virtuous deeds springing out immortal, dwelling amidst mortals; firm as counsel of kings, or as the earth; the wind shakes it not, giving to life the flavour of nectar, the kali-yug affixes no stain to it, containing truth, wisdom, and perpetual freshness."

दुष्टै न वाय नप नीति धृति । खाद् वक्षत जीवन करिष ॥  
कलि जाय न लगे कलक रवि । सत सत खाडति धरिष ॥ १ ॥

- III. The Vedic Scriptures, God's best gift,  
First claim respect profound,  
With three-fold branches spreading wide,  
Each leaf a lettered sound ;  
Its bark religion, whence the bud  
Of virtue forced its birth,  
Ripening to fruit of noble deeds,  
Heaven's bliss midst men on earth.  
Who tastes, unshaken by the blast,  
Firm as king's counsel, stays,  
Aye growing to more perfect good,  
Unsoiled by these foul days.

I have headed these stanzas 'Chhappai,' that being a more correct designation of them than 'Kabitt.' In the first line the word *pramān* is precisely identical in meaning with *nigam* in the following line ; both are synonymes of the Veda. A strictly literal translation would be "first having taken the blessed scriptures, reverence them, the divine oracles, the original Veda." It will be noticed that the poet keeps hovering round the same idea, which he repeats in three different metres. Line four here corresponds precisely with line five of the Vathūa, and as there *baran* must be translated 'A letter of the alphabet.' In the last line occurs the word *ārhati*, which I translate 'growing,' taking it to be formed from the root *ridh*. A Mathurā Pandit explained it by *sambandh*, 'connection ;' in which sense chiefly as a business term, for dealings with an *arthiya*, or 'broker,' the word is still very common.

#### IV. कव्यै ।

भुगति भूमि किय क्यार । वेद भिंचिय जल पूरन ॥  
बोध सुवय लेय मध्य । ज्ञान खड्ग सजूरन ॥  
विभुज साष संपदिय । नाम बड पन रत बिजित ॥  
सुकरस्य सुमन फुल्यो । भुगति पक्षा द्रव सगति ॥  
दुज सुमन डसियबुध पक्ष रस । बड विलास गुन पसरिय ॥  
नर रक्ष साष नय लाक मचि । अजय विजय गुन विसरिय ॥ ४ ॥

#### IV. The prose translation :

"Taking possession of the earth like a garden-plot ; irrigating it with the fulness of the Veda as with water ; placing in it good seed, upsprung the shoot of knowledge, combining branches of three qualities, with leaves of many names, red as earth. It flowered with good deeds and good thoughts, complete deliverance, union of substances. The twice-born of pure mind have experienced its flavour of perfect wisdom, a banian tree of delight, spreading abroad virtues ; the branches of this excellent tree in the three worlds, unconquered, victorious, diffusing virtues."

- IV. The world, a pleasant garden-plot,  
 Watered with Vedic lore,  
 From good seed cast into its midst  
 The plant of wisdom bore.  
 Three great boughs spread, and the earth grew glad  
 At the leaves' new melody,  
 While flowers of virtue swelled to fruit  
 Of immortality.  
 The bird-like sage quaffed the sweet juice  
 Of this exquisite marvellous tree,  
 With its single stem and its far-spreading boughs  
 Full of glory and victory.

In the first quatrain, the only word of any difficulty is *bhugati*, which I take to be equivalent to *bhog*. In the second occurs the phrase *ratt chhiti*. Here *ratt* is simply the past participle of the verb *rang*, meaning not 'red,' nor even 'coloured,' but in its secondary sense 'affected by love,' like the more common *mohit*, 'charmed.' The two words are parenthetical, and the most literal translation of them possible is 'earth is charmed.' The three boughs, to which such frequent reference is made, can scarcely be taken to mean the three qualities *sattva*, *rajas*, and *tamas*, but indicate rather that the influence of religion extends over the three worlds of earth, heaven, and hell. In line seven, I have altered *susan*, apparently a mere misprint, to *suman*, not 'good thoughts,' but 'a flower.' In the ninth line, *duja* might mean 'twice-born;' but it seems a more appropriate carrying out of the allegory to take it in its other well-known sense of 'a bird.'

हृद मुजंगप्रयात ।

- प्रथमं मुजंगी सुधारी पद्यम् ।  
 जिनै नाम एक अनैक कवचम् ॥  
 दुती सवभयं देवतं जीवतेसं ।  
 जिनै विश राखी बली संज सेसं ॥  
 5. चवं वेद वंशं हरी किति भाषी ।  
 जिनै भग्न साभग्न संसार साषी ॥  
 हती भारती भास भारदय साषी ।  
 जिनै उत पारदय सारदय साषी ॥  
 चवं सुषदेवं परोषण पायं ।  
 10. जिनै उषयो सर्व कुव वंस रायं ॥  
 नर रूप पंचम श्रीचर सारं ।  
 नक्षेराय कंठं दिनै राख सारं ॥  
 हठं कासिदास सुभाषा सुवचं ।  
 जिनै बाज बानी सुधानी सुवचं ॥

15. किथौ कालिका मुख बारं सुमुख ।  
जिनै सेतु बंधौ तिभोवप्रबंध ॥  
सतं दंडमाछो उल्लाछो कविनं ।  
जिनै बुद्धि तारन गंगा सरित् ॥  
जयदेव चढठं कवी कविय रायं ।
20. जिनै केवल किति गोविन्द गायं ॥  
गुरुं सख कव्यो लल्लं चंद कव्यो ।  
जिनै दरयं देवि सा खंग कव्यो ॥  
कवी किति किमी उक्ती सुदिखी ।
24. तिनं की उचिछी कवी चंद भव्यो ॥
- V. First reverence to the serpent-king, who ordereth all things well,  
Whose name is told ways manifold, though one, unchangeable.  
Next be adored the Sovereign Lord, the god of quick and dead,  
Who by strong spells set fast the world on the great serpent's  
head.
5. In the four Vedas' holy texts is Hari's glory shewn,  
A witness to eternal truth, where only sin was known.  
Be Vyása third, from whom was heard the tale of the Great War,  
Where Krishna, first of charioteers, drove Arjun's sounding car.  
Fourth, Sukadev, who at the feet of king Parikshit stood,
10. And wrought salvation for the whole of Kuru's lordly brood.  
Sri Harsha, fifth, pre-eminent in arts of poesy,  
Who on king Nala's neck let fall the wreath of victory.  
Sixth Kálidás, in eloquence beyond all rivals great,  
Whose voice the heavenly Queen of Speech vouchsafed to  
modulate.
15. Upon whose lips great Káli's self thought it no shame to dwell,  
The while he framed in deathless verse King Bhoja's Chronicle.

V. The prose translation :

First be the well-adorned Bhujangi taken, whose name this one is spoken in many ways. Second be taken the god, the lord of life, who placed the universe by powerful spells on Sesh-nág. In the four Vedas by the Brahmins the glory of Hari is spoken, of whose virtue this unvirtuous world is witness. Third the Bháratí Vyása spake the Bháráth, who bore witness to the more than human charioteer. Fourth Sukadeva at the feet of Parikhit, who extolled all the kings of the race of Kuru. Fifth .....who placed a six fold necklace on the neck of king Nala. Sixth Kálidása, fair of speech, fair of wit, whose speech is that of a poet, a master-poet, fair-speaking, was made the pure fragrance of the mouth of Kali, who firmly bound the dyke of three-fold enjoyment. Seventh, Danda-Máli's charming poem, the wave of whose wit is as the stream of Gangá. Jayadeva, eighth, poet, king of poets, who only made the song of Govinda. Take all these poets as thy spiritual guide, poet Chand, whose body is as a sacrifice inspired by Devi. The poets who have uttered praises and excellent speech, of them poet Chand has spoken highly."



- Be seventh in place the jocund grace of Danda-Máli's theme,  
Sweeping along, full, deep and strong, like Ganga's mighty stream.  
Eighth Jayadeva, bard of bards, most worthy that high name,  
20. Whose sole delight to tell aright the great god Gobind's fame.  
Thus each great name of elder fame I the bard Chand invoke ;  
For as the present god inspired, those loving servants spoke.  
In humble phrase I dare to praise the deeds of one and all,  
24. Who can but gather up the crumbs that from their table fall.

If this passage is genuine, and there seems no reason to doubt the fact, it is of some value in the history of Sanskrit literature as tending to determine the date of the two poets Śrī Harsha and Jayadeva. Dr. Bühler assigns the former to the middle of the twelfth century, relying chiefly on the authority of Rájá Sekhara, a Jain writer of about the year 1350 A. D. This view, which is by no means in accordance with ordinary Hindu tradition, has been ably combated in the pages of the Indian Antiquary, and must now be considered as finally refuted. For though Chand may not have been a very profound critic of Sanskrit style, and may have been as regardless of chronological precision as most of his countrymen, still it is impossible that he should have committed the blunder of referring to remote antiquity a writer, who—according to Dr. Bühler's hypothesis—would have been all but, if not quite, his contemporary. Similarly in Jayadeva's case, the desire of European scholars to prune down the exaggerated figures, in which Hindus are prone to indulge, has led to error in the opposite direction. Professor Wilson concludes him to have been a disciple of the great religious reformer Rámánand, who flourished in the thirteenth or fourteenth century. This connection, so far as I can ascertain, is not warranted by any text in the Bhakta Málá, the recognized authority for the lives of the Vaishnava saints, and is totally disproved by the fact now brought to light that Jayadeva is mentioned by name by Chand, who wrote some hundred years before the time of Rámánand even.\*

The metre *Bhujanga prayāt* is a series of rhyming couplets, each line comprising four of the foot called in Sanskrit prosody *Ya-gan*, i. e. one short followed by two long syllables. In the twenty-four lines, as originally printed, there are as many as eighteen false quantities; but the defect in every instance is obviously the result of mere carelessness on the part of the transcriber, and has been rectified by some one of the three simple and recognized prosodiocal expedients, *viz.*, the introduction of an *anuvāra*, the reduplication of a consonant, or the change of the quantity of a vowel. In the first line, the word *Bhujangi* contains an allusion to the name of the

\* I have stated the argument at greater length in two letters on the subject which have appeared in the Indian Antiquary.

metre, which it is quite impossible to preserve in a translation, but primarily it denotes the serpent God, Sesh-nág; *bhujanga* being a common name for a serpent. *Sudhári*, like every other word with the same termination, has not a passive but an active signification, and means 'the good arranger;' as *mantra-dhári* means 'a layer down of counsel,' and *rās-dhári* 'a composer of dances.' It will be observed that the poet is giving a brief catalogue of all the great authors of earlier date, and places at their head the god Sesh-nág, the first artificer or *ποιητής* of the universe. He then passes on to the Vedas, which he represents as directly inspired by Vishnu, and thence to the Mahá-bhārat of Vyāsa, the Śrī-Bhāgavat of Suka-deva, and so on, in each case either mentioning by name or describing the author's principal work and eulogizing his genius. Thus in the fifth line we are forbidden by the context from taking the obscure word *bambham* to represent the 'Brahmans' as the authors of the Veda, which has already been distinctly ascribed to Vishnu himself. I would rather consider it as a corruption of *babhrū*, a title of that god, and couple it with the word Hari which immediately follows it.

In line eight, *utta* would seem to be an abbreviation for *uttam*, 'the best;' while *Pārathth* is simply the Hindi form of the Sanskrit *Pārtha*, meaning 'the son of Prithá,' a very familiar name of Arjun, the great hero of the Mahá-bhārat. In lines nine and ten, the reference is to the Śrī Bhāgavat, which was recited by Sukadeva to king Parikshit when at the point of death, as the best means for procuring the 'salvation' (*uddhāra*) of his soul.

In the following couplet, I have corrected the unmeaning word *shaddha* to *suddha*. The allusion is to Śrī Harsha's famous poem, the Naishadha, which narrates in twenty books the adventures of the hero Nala, king of Nishadha, and concludes with the description of the Svayam-vara, where Damayanti in token that she had selected him for her husband 'dropped upon his neck the wreath of flowers.'

Lines thirteen to sixteen are eulogistic of the great poet Kālidāsa, to whom Chand ascribes, not with perfect accuracy, the composition of the Bhoja-prabandha, a work in mixed verse and prose.\* A literal translation of line fourteen would be "whose voice Sarasvati made a charming voice," *vāg* being not 'speech' but the 'queen of speech;' and *vāni* not 'a poet' but 'voice.' In line fifteen, *vāsam* is not 'fragrance,' but 'an abode;' and in line sixteen the words *setu bandhyau* mean simply 'composed,' having been selected with alliterative allusion to the *prabandha* which forms part of the title of the work under mention. It may be noted upon lines seventeen and eighteen, that Danda-māli's great work, the Dasa-Ku-

\* The prose frame-work is known to have been composed by Ballāla Misra, but many of the poetical extracts may with great probability be ascribed to Kālidāsa.

mara-Charita, has still less claim than the Bhoja-prabandha to be considered a poem ; since unlike most Sanskrit literature it is entirely in prose. The style, however, is sufficiently elaborate to make it ordinarily included among the Kāvyaas.

In line twenty, an alteration required by the metre is equally essential for the sense : *kitti*, with the last syllable long, being when so spelt the past participle of the word *karná*, 'to make,' must be corrected to *kitti*, with the last syllable short, a corruption of *kirti*, 'fame.' *Gáyam* also should be translated as the verb 'sung,' rather than as equivalent to *gíta*, 'a song.'

In the twenty-second line, *habbi* cannot possibly be taken as a derivative from the root *hu*, 'to sacrifice ;' it is far more natural to connect it with *háva*, 'love and dalliance.' In the last line, I take *uchishti* as a substitute for *uchchhishta*, corresponding to the Hindi *jhuthá*, 'the fragments of a feast.'

## VI. दोहा ।

अचिष्ट चंद हंदच वयन । सुनत सु जंपिय नारि ।  
तन पवित्र पावन कविच । उकति अनूठ उधारि ॥ ६ ॥

## VI. Hearing Chand rate his art so low,

His lovely consort cries :

O pure and all unblemished bard,  
Skilled in rare harmonies.

Here *uchisht* must of course be taken, as at the end of the last stanza, to denote something utterly low and vile. In the third line *tan pavitra* is rather 'pure of body' than 'purifier of the body,' and *pávan*, with precisely the same meaning, is added simply for the sake of emphasis.

## VII. दूष्ये ।

कहे कंति मन कंत । तन पावन बड कविच ।  
तंत मंत उधार । देवि दरसिय मन्नि दूषिय ॥  
तंत बीर उधंत । रंम राजन दुष दारैय ।  
बाळ केळ प्रत्यंत । सुरनि उबारि कवितारैय ॥

## VI. The prose translation :

"The speech in verse of Chand, excellent, hearing him utter, his wife says, Purifier of the body, O poet, uttering excellent speech."

## VII. The prose translation :

"Saith the wife to her husband : Purifier of offspring, great poet, uttering spells and charms, like an oblation offered to Devi, hero of spells, very terrible, giving pleasure to kings by thy poetry : the childish sports one by one of the gods having extolled in thy poems, having uttered unchecked speech, from which to me comes wisdom, that word which is the visible form of Brahm, why should not the best of poets speak  
॥ P"

अबलव उक्ति उचार करि । जिहित मोहि कोविद रहै ॥  
समब्रह्मरूप या सबद कहुँ । को उचिष्ट कवियन कहै ॥ ७ ॥

VII. Nay, good my Lord, thus quoth his spouse,  
Great bard, unblemished elf,  
Whose prayers and spells have power to win  
The love of Heaven itself,  
Hierophant of mystic lore,  
Charm of the courtly throng,  
Like to a child in untaught play  
Lispings divinest song ;  
In faith pronounce one holy name  
(For faith and love make wise),  
'Tis Brahma's self ; no dregs of eld  
Deem then thy melodies.

There can be no question as to the meaning which the first line is intended to convey, but it seems impossible grammatically to extract that meaning from it, if the word *sama* be retained. I have altered it to *mama*. In the second line also, I have made a change by substituting *tan* for *tant* ; it now corresponds precisely with the third line of the preceding *doha* ; and a repetition of the kind, after a change of metre, is a very favorite artifice with Hindi poets. The erroneous reading of *tant* is due to its occurring at the commencement of the very next line, where it caught the copyist's eye. In the third quatrain, I have introduced two emendations ; first by combining *ko* and *vid* into one word *kovid*, 'wise ;' and secondly, by joining *kabiya* with the following negative, and so converting it into the plural form *kabiyan*. The words *habbiya* and *uchisht* have already been commented upon.

VIII. ज्यै । चंद वाक् ।

सम वनिता वर वंदि । चंद अपिय कोमल कल ।  
सबद ब्रह्म रह सति । अपर पावन कहि असल ॥  
जिहतत सबद नहि रूप । रेष आकार ब्रह्म नहि ।  
अकल अगाध अपार । पार पाव न नयपर सहि ॥  
निहि सबद ब्रह्म रचना करौ । गुरु प्रसाद सरस प्रसन्न ।  
अद्यपि ह्य उक्ति सुकौं अगति । तो कमलवदनि कवितह हसन ॥ ८ ॥

VIII. The prose translation :

"To his wife saith the bard Chand, muttering soft and low, that true word of Brahm, purifier of all others, itself pure, that word which has no form, stroke, letter, or colour, unshaken, unfathomable, boundless, purifier of all things in the three worlds, that word of Brahma let me expound, the glory of the Gurus, pleasing to Sarasvati, if in the arrangement of my phrases I should succeed, it will be pleasing to thee, O lotus-faced one."

With reverence to his dearest spouse  
 Quoth Chand in accents mild :  
 That holy name of God most high,  
 Pure, infinite, undefiled,  
 Beyond the compass of all shape,  
 Form, stroke, or lettered sign,  
 Fathomless, indivisible,  
 That no sphere can confine,  
 Hymned I that name, by my lord's help  
 And Sarasvati's grace,  
 Jeers still would mock my faultering style,  
 O Queen of the lotus face.

In the first line, I have allowed the word *sam* to stand, thinking it possible that it might be intended to represent the Sanskrit *swa*. The combination *barbandi* would seem to be a misprint; though it is impossible to say, as it is omitted altogether from the prose translation; obviously it consists of two distinct words *bar* 'excellent' and *bandi*, 'reverencing.' In line seven, *akal* is not 'unshaken,' but 'without parts,' that is 'indivisible.' The next line literally translated would be 'that can find no limit in the three worlds;' पावन being divided into पाव न. In the eighth line, *prasād* is not in opposition to *rachná*, but the words are parenthetical, and the construction expressed in full would be *Guruke prasād se, aur yadi Sarasvati prasann ho*. In the eleventh line, for *chukaun* with *u* short, meaning 'to complete,' I think it would be better to read the same word with *ú* long, meaning 'to fail.'

IX. छप्पै । चंद की वाकं ।

तुम बानो वर वंद । नाग देखंत विसल मति ॥  
 चंद संग गुन रहित । कंठ कौमार काय छत ॥  
 बुधितरंग सम गंग । उकति उच्चार अमिय कल ॥  
 सुनर सुनत विहसंत । संत अनु वक्ष करन बल ॥  
 अवतार भय प्रथिराज पछ । राज सुष तिन समलक्षहि ॥  
 वीराधिबीर सामंत सब । तिन सु गण्ड बखो कहहि ॥ ८ ॥

IX. O reverent and most pure-souled bard,  
 Versed in all rhythmic law,

IX. The prose translation :

"Thou art the poet, the excellent bard, gazing on the heavens with unclouded intellect, skilful in the arrangement of metres, having made the song of the peacock-youth. The wave of thy wit is like Gangá, uttering speech immortal, soft, good men hearing it are rejoiced, it subdues like a spell of might. The incarnation king Prithirāj the lord, who maintained the happiness of his kingdom, hero, chief of heroes, and all his paladins, of them speak a good word."

Who lisped in numbers as a babe,  
 Numbers that knew no flaw,  
 Like Gangā's stream, on pours thy song  
 In rich mellifluous flood,  
 A spell of might that all confess,  
 But most the wise and good;  
 The incarnate god, who rules the world,  
 King Prithirāj the Great,  
 Of lordly chieftains lordlier lord,  
 Be it thine to celebrate.

The word *nág* which occurs in the second line, is one that bears many meanings, but the context shews that in this passage it must be interpreted in its technical sense of 'the art of prosody.' A literal rendering of the next two lines would be 'whose verses are without any faults who in childhood made poems.' I fail to discover any possible allusion to the Kumárasambhava. In the sixth line *amiya kal* are 'sweet strains,' without any reference to 'immortality.'

X. छन्दे । चन्द बाक्व ।

गङ्गावती प्रति चन्द । चन्द कोमल उच्चारिय ॥  
 मङ्गरनी रसवेली । सुरन सागर रस धारिय ॥  
 वक्क नयन वयबाल । प्रानवक्कम सुखदाईय ॥  
 मङ्क चमन निगन पञ्चनि । मङ्गरिपजा फल पाईय ॥  
 भर चादि चन कविता जिनै । तिन चनन गति मति कहिय ॥  
 चनक पंच तिव वरन वत । यौ उचिह मतिनै छहिय ॥ १० ॥

X. Unto his fair and stately dame

Quoth Chand in loving wise :

Dear charmer, clinging vine of love,

Foretaste of Paradise,

With girlish eyes of witching glance,

My queen, my soul's delight,

Noting all faults but knowing none,

Heaven's rich-dowered favourite ;

List while I tell in faltering tones

How infinite a throng,

X. The prose translation :

"To her of the elephant gait, Chand singing a pleasant rhyme said, Ravisher of the soul, tendril of enjoyment, possessing the *fragrance* of the ocean of the gods, thou of the glancing eye, in the flower of thy youth, beloved of my soul, giver of bliss, wife, free from all evil qualities, thou who hast obtained the fruit of the worship of Gauri, as many poems as there have been from first to last, *consider how endless a string there is of them, the description of this matter is in many books, thus having taken in the best counsel.*"

Of diverse talents, diverse theme,  
Are the great lords of song.

In this passage the only line of any difficulty is the seventh, which I translate 'faultless, observant of faults;' omitting the first word *garu*, which may either represent *garv*, 'pride,' or be a mis-reading for *guru*. A literal rendering of the last quatrain would be 'from first to last what poems there have been, their endless (varieties of) style and theme I tell. Countless are the books: now gather from my poor wit this attempt to describe them.'

# XI. बंद पद्यरी ।

प्रथम प्रथम तम आदि देव ।  
ॐकार सवद् जिन करि आवेव ॥  
निरकार मध्य साकार कीन ।  
मनसा विलास सह फल फलीन ॥  
चयगुनह तेज चयपुर निवास ।  
सुर सुरग भूमि नर नाम भास ॥  
पुनि ब्रह्मरूप ब्रह्मा उचारि ।  
कथि चतुर वेद प्रभु तत्त सार ।  
वरमयौ आदि करता अलेख ।  
गुन रहित गुननि नह रूप रेख ॥

- XI. First I adore the one primeval Lord,  
Who breathed the unutterable, eternal word ;  
Who out of formless chaos formed the earth,  
And all creation, as he willed, had birth.  
Through the three spheres his three-fold glory sped.  
Fiends, gods and men—earth, heaven and hell o'erspread.  
Then the supreme, in Brahma's form revealed,  
By the four Vedas heaven's closed gate unsealed.  
How sing the great creator, uncreate,  
Passionless, formless, aye unchanged in state :

And so on for the remainder of a long paragraph ; which, as it contains nothing of special difficulty, has already been adequately translated, and therefore need not be repeated. It does not advance very far in the promised poetical catalogue, for after extolling the divine author of the

## XI. The prose translation :

"First reverencing my first of gods, who uttered the imperishable word Om, who made the formed out of the formless, the will of his mind blossomed and bore fruit, the sheen of the three qualities, inhabiting the three worlds, *shining on gods in heaven, men on earth, serpents in hell.* Then in the poem of Brahma *leaving the Brahma-egg*, the lord, the essence of truth, said the four Vedas, *the creator uttered them unwritten*, without qualities, having neither form nor line,

Vedas, it just mentions by name the Purānas, the Rāmāyana and the five Mahā-kāvyas; when the poet is stopped by his wife, who desires to have the Purānas enumerated more in detail. In the seventh line, I prefer the alternative reading *Brāhmā uchāri* to *Brahmānda chāri*, which the editor has adopted; and I translate 'then spake Brahma, the visible form of Brahm,' which appears to me a very simple and intelligible form of expression.

Before concluding this article, it may be interesting to adduce a specimen of a genuine native commentary on Chand: accordingly, I append a paraphrase of the first four lines of invocation, written by Pandit Mākhan Misr, a Sārasvat Brāhman, resident in Mathurā, who has the largest library of Sanskrit MSS., and is one of the best-read scholars in that city of Sanskritists.

श्राटक ।

आदि कहियै प्रथम नम्य कहिय नमस्कार करवे सारक ओ गुरुय गुरु तिनै\* प्रणम्य नमस्कार करके पय कहियै जल सरोकी निर्मल अथवा दूध सरोकी खेत सैसी ओ बानीय नाम सरस्वती ताथ नमस्कार करुल्ल कैसे गुरु हैं शिष्ट कहियै परंपरामर्यादानके राजनवारे हैं फिर कैसे हैं धारन कहियै ध्यानादिक ओ अष्टांगयोग हैं ताके धारय कहियै धारण करवे वारे हैं अब पश्यपती कहियै महादेवओ अब लकीश कहियै लक्ष्मीक खानी ओ विष्णु इन दोनोंके ओ चरण हैं तहैं आनय जिनहुं सैसे गुरुनहुं फिर कैसे गुरु हैं तमगुन ओ तमोगुण हैं सो न तिष्ठति कहियै नहीं धिनके विधैं स्थित हैं अब ईश कहियै समर्थ हैं अब दुष्ट कहियै पाप ताहुं दहन कहियै अग्नि सरोकी जराय-वेवारे हैं अब सुरनाथ ओ इन्द्र ताकी ओ सिद्धी कहियै संपत्ति ताके नय कहियै आनय हैं अर्थात् ओ कोरु गुरुनकी सेवा करे हैं ताह रन्ध करदें हैं यावर कहियै दयादिक अब अंगस कहियै मनुष्यादिक ओ जीवमात्र तिनहुं चंदनमय नाम चंदन जैसे शीतल हैं सर्वेश कहियै सबके खाना हैं वरद कहिये वरक देवेवारे हैं अश्वय कहियै निर्भय ॥ १ ॥

The above is a good illustration of the extreme difficulty which really learned Hindus, whether they come from the east or the west of India, find at the present day in understanding their own vernacular in its earliest form. Their suggestions as to the train of ideas, traditional usage, &c., are often valuable; but their etymological explanation of particular words is frequently of the wildest and always requires confirmation. Hence the English editor of Chand must in the main depend on his own resources and stand or fall by himself.



*The Initial Coinage of Bengal under the early Muhammadan Conquerors.*  
*Part II.—By E. THOMAS, F. R. S.*

(Continued from Journal, Vol. XXXVI, 1867, p. 73.)

The discovery of an undisturbed hoard of no less than 13,500 coins in Koch Bihâr, inhumed some five centuries since, recently claimed attention both from the number and importance of its representative specimens, which so effectively illustrated the history of the kingdom of Bengal for a consecutive period of some 107 years.\* The earliest date thus accorded towards the purely Initial Coinage of the country under its newly-installed Muslim administrators did not reach higher than the reign of the Empress Raziyah, A.H. 634-637 (A.D. 1236-1239), or more than 84 years after the first entry of the adventurous *Khilji* and *Turki* troops into the recognized Hindû capital of the lower Ganges.† A still more recent discovery of a comparatively poor man's *cache*, in the fort of Bihâr,‡ elucidates an earlier chapter of the local annals: and though the contents of the earthen vessel in this case are limited in number to a total of 37 pieces, and restricted in their dates to a term of 13 years, they, in some respects, compete advantageously with the previously-recovered unexampled store, in the value of their contributions to the obscure records of the Gangetic Delta, and in priority of date bring us more than 20 years nearer to the first occupation of Bengal by Muhammad Bakhtiyâr *Khilji* in 600 A.H. As in the larger and almost regal treasure trove of Koch Bihâr, the specimens in the present instance prove to be essentially of home or indigenous fabric. With the exception of a single northern piece of the supreme *Sulṭān* of India, they are one and all the produce of the mints of Bengal proper, and mark with singular fidelity the varied incidents of the alternate rise and fall of the provincial governors during the unsettled relations existing between suzerain and vassal from A.H. 614 to 627, when Altamsh came into real and effectual possession of the south-eastern portion of his Empire.

\* Journ. R. A. S. (N.S.) Vol. II., 1866, p. 145. Reprinted in the Journal of the Asiatic Society of Bengal, vol. XXXVI, 1867, p. 1.

† The name of Nudda, नवद्वीप, *Navadvīpa*, the "new island" (converted into *نودیه* *Nudīyah* by the Muslims), would seem to imply a southerly movement, in concert with the silt of the Ganges, of the seat of Government down to the comparatively modern occupation of this site, on the abandonment of the successive traditional capitals of earlier dynasties.

‡ I have no information as to the exact circumstances of the discovery of this small hoard, beyond the general intimation that it was secured by Mr. A. M. Broadley, in or near the Fort of Bihâr. The coins have now become the property of Colonel Guthrie, who had already contributed the materials for my earlier notice of the Initial Coinage of Bengal.

One of the most instructive facts disclosed by these few pieces is, that the rich and comparatively undisturbed territory of Bengal felt the want of a supply of *silver* money long before a similar demand arose in the harassed provinces of the North-West. The southern coins date, as far as can be seen, some nine years prior to Altamsh earliest effort at a silver coinage in his northern dominions; and even Raziyah's silver money of deferred date bears every token of exclusive manufacture in the subordinate Lak'hnauti mint.

I have already quoted the testimony of Minhāj i Sirāj, to the effect, that on the first conquest of Bengal by the Muslims, they found no metallic or other circulating media of exchange except that supplied by *cowries*;\* even the compromise of the mixed silver and copper *jitals* of the various Hindú dynasties of the central Rājput tribes was unknown in the sea-board marts of the south.

The chronicles of the proximate kingdom of Orísá, whose boundaries touched, if they did not often trench, upon the ancient kingdom of Gaur,† explain how so infinitesimal and largely distributed a currency was able to supply the wants of so rich and essentially commercial a population. It would appear, from the official records preserved in the Temple at Púri, that although there was no silver money in use, gold in convenient weights, if not in the form of absolute coin,‡ was freely interchangeable with the more bulky heaps of cowries. In these same official *palm-leaf* documents we find the powerful king of Orísá, Anang Bhím Deo (A.D. 1174-1201), describing the geographical limits of his kingdom, specifying, with close exactitude, its now *proved* superficial area (39,407 square miles); and adding that, as the revenues of his predecessors of the Kesari line had amounted, with a more limited extent of territory, to 15,00,000 *marks* of gold, so his own added boundaries had raised the State income to 35,00,000 *marks*. Mr. Stirling (our most trusted revenue authority), relying upon still-extant local

\* J.R.A.S. (N. S.) II., p. 148. See also Hamilton's *Hindustan*, i., 40.

† Mr. Stirling says, under the Ganga Vansa line, for a period of nearly four centuries (from A.D. 1132), the boundaries of the rāj of Orísá may be stated as follows: . . . . "North, a line drawn from the Tribeni, or Triveni, Ghát above Húglí, through Bisnápúr, to the frontier of Patkúm: East, the river Húglí and the sea." *As. Res.* xv. 164. Hunter i., 280. "To the north of the mouth of the Saraswatí lies the broad and high Tribeni Ghát, a magnificent flight of steps, said to have been built by Mukund Deo, the last Gajpati of Orísá." Blochmann, *As. Soc. Bengal*, 1870, p. 282.

‡ On the above occasion, likewise, a new coin and seal were struck by the Rájá's orders, with the titles which are used to this day by the Khurda Rájás, who claim to represent the majesty of this once powerful race. They run this: *Víra Sri Gajapati, Gauréswara*, etc. "The illustrious Hero, the Gajpati (Lord of Elephants), sovereign of Gaura (Bengal), Supreme Monarch over the rulers of the tribes of Utkalá, Karnátá, and the nine forts," etc. Stirling, *As. Res.* xv., p. 272.

tradition, defined the *mark* at 5 *máshas'* weight;\* while Dr. Hunter, under later and more vague native inspiration, pronounces it to be  $\frac{1}{4}$  of a *karishá*, which measure may be assumed to represent the local pronunciation of the old widely-spread *karsha* of Mánu, corresponding with the normal weight of the gold *suvarna*, i. e. 80 *ratis*.† Taking the *rati* at 1.75 grains, this will make Mr. Stirling's return amount to 43.75 grains ( $5 \times 5 = 25$ ;  $25 \times 1.75 = 43.75$ ) per *mark*; whereas Dr. Hunter's estimate, under the same figures, would only produce 35 grains ( $140 \div 4 = 35$ ); but, as he assumes the modern *karishá* to be equal to "one *Tblak* or one Rupee" of our modern system,—the amount of which however he does not further define‡,—and taking the 180 grain total as the test,§ the result is not far removed from Mr. Stirling's earlier estimate under the old régime;—producing, in effect, a return of 45 grains for the *mark* ( $180 \div 4 = 45$ ). But, singular to say, if we revert to the more ancient standard of the

\* Asiatic Researches, xv., 271. Mr. Stirling, however, seemed to imagine that the sum named for the total revenues, as tested by this estimate, was too high; but later investigations fully support the reasonable measure of the king's boast.

† J.R.A.S., II., pp. 169, 170. Chronicles of the Pathán Kings, p. 221.

‡ "Orissa," a continuation of the "Annals of Rural Bengal," (London, Smith and Elder, 1872) i., pp. 316, 317. Dr. Hunter, like myself, has endeavoured to make his antiquarian researches instructive in their application to the defects of our own government in India, consequent upon the too frequent disregard of the superior local knowledge and hereditary instincts of the races we are appointed to rule over.

After enumerating the ascertained totals of the revenue of the province at various periods, the author goes on to say, "From time immemorial Orissa, like some other parts of India, has used a local currency of *couries*. When the province passed into our hands in 1803, the public accounts were kept and the revenue was paid in these little shells." We "however stipulated that the landholders should henceforth pay their land-tax in silver, and fixed the rate of exchange at 5120 *couries* to the rupee." (In 1804, the official exchange was 5120, and the practical rate of exchange from 6460 to 7680.) . . . "Had our first administrators contented themselves with taking payment in silver at the current rate of the cowrie exchange, the Orissa land-tax would now have been double what it is at present. But had they resolved to collect it at a grain valuation, according to Akbar's wise policy, it would now be more than double; for the prices of food have rather more than doubled since 1804. The system of paying the land-tax by a grain valuation appears to me to be the best means of giving stability to the Indian revenues."—Orissa, ii., 172. Dr. Hunter had not seen my notice of "The Revenues of the Mughal Empire" (Trübner, 1872) when this was written. I had equally appreciated the equity and suitableness of the system of estimate by agricultural produce, which had come down to Akbar's time from the earliest dawn of the civilization of the nation at large; but I had to condemn Akbar for introducing a new element in the shape of a settlement to be paid in silver, on the average of the prices of previous years—an assessment he hoped, in defiance of the proverbial uncertainty of Indian seasons, to make immutable; furnishing, in effect, the leading idea we so unwisely followed in that deplorable measure, Lord Cornwallis's "Permanent Settlement of Bengal."

§ Prinsep's Essays, U.T., p. 7.

*sataraktika*, or 100-*rati*\* weight,—a metric division which was reproduced and reaffirmed in the authorized *tankah* of the Pathán dynasty, and to which we have to allow a theoretical weight of 175 grains,—Dr. Hunter's  $\frac{1}{4}$  *toláh* will come out, to the exact second place of decimals, of the 43·75 ( $175 \div 4 = 43\cdot75$ ), obtained from Mr. Stirling's data.

The determination of the true weight of the *rati* has done much both to facilitate and give authority to the comparison of the ultimately divergent standards of the ethnic kingdoms of India. Having discovered the guiding *unit*, all other calculations become simple, and present singularly convincing results, notwithstanding that the basis of all these estimates rests upon so erratic a test as the growth of the seed of the Gunjá creeper (*Abrus precatorius*), under the varied incidents of soil and climate. Nevertheless, this small compact grain, checked in early times by other products of nature, is seen to have had the remarkable faculty of securing a uniform average throughout the entire continent of India, which only came to be disturbed when monarchs, like Sher Sháh and Akbar, in their vanity, raised the weight of the coinage without any reference to the number of *ratis* inherited from Hindú sources as the *given* standard, officially recognized in the old, but altogether disregarded and left undefined in the reformed Muhammadan mintages.

I may as well take this opportunity of disposing of the other technical questions bearing upon the general subject; and, without recapitulating the investigations elsewhere given at large, I may state generally, that I understand the *rati* to have been 1·75 grains, the 100 *rati* piece—reproduced in the ordinary Dihlí *tankah*—175 grains. The Rájput *jítal*, composed of mixed silver and copper, preserved in the early Dihlí currencies of the Muslims, is  $\frac{1}{4}$  in value of the 1·75 grain silver coin; but the number of *jítals* in any given composite piece was dependent upon the proportional amount of the silver added to the ruling copper basis. The *kání*, like the *jítal* is  $\frac{1}{4}$  of the *tankah*; but the *kání* is found to be the practical as well as the theoretical divisor, applicable alike to land and other measures, preserving its more special identity in the southern peninsula. Both terms have now been found in conjunction on a single piece of metropolitan fabric, where the *jítal* is authoritatively declared to be of the value of *one kání*.† In more advanced days under the Patháns, immense quantities of pieces were coined to meet the current exchange

\* *Chronicles of Pathán Kings*, pp. 3, 167, 223, 224 (note). Dr. A. Weber, in the *Zeitschrift* for 1861, p. 189, cites the parallel designation of *Sata Krishnala*, from the *test* of the Black Yajur Veda (*circa* 800 B.C.). The commentator uses the local name above quoted.

† *Numismatic Chronicle* (N.S.) iv., p. 40, *et seqq.* J.R.A.S. (N.S.), II., pp. 150, 166, 168. *Chronicles of the Pathán Kings of Dehli*, pp. 161, 262.

answering to  $\frac{1}{4}$  or  $\frac{1}{2}$  of the *tanka*; and under Muhammad Tughluq, amid other useful breaks in the too-uniform descending scale of the small change, a new division was introduced in the form of a  $\frac{1}{8}$  or *six-kant* piece, which subsequently became better known as the *black tanka*.\*

It would appear that the normal or conventional rate of exchange of the precious metals mechanically accepted in India from the earliest times was as silver to gold 8: 1; copper to silver 64: 1. Of course these rates were constantly liable to fluctuation.† Indeed, we can trace the effect of the influx of the gold of the Dak'hin, after its conquest, in the fall of that metal, evidenced by the obvious readjustment of the weights of the gold and silver coinage at the Imperial seat of Government. But the copper rate must have had a very extended lease of immutability, as this ratio of 64: 1 was maintained from the most primitive ages up to the time of Sikandar Lodi (A.D. 1488-1517).

As regards the application of these data to the examples specially under review, it would seem that the Bengal silver coinage was, from the first, deficient in weight in reference to the corresponding issues of the Dihli mint; but the Dihli silver coins were avowedly designed to fall in with the concurrent gold pieces of identical weight, and of full standard in metal: whereas we must suppose that the Lak'hnavi silver pieces, in introducing a new element, were graduated to exchange *in even sums* against the extant gold currency of Bengal and Orisá. Now the gold *mark* weighed, as we have seen, 43.75 grains, which, with gold as 1 to 8 of silver, would require 350 grains of the latter metal as its equivalent, or *two* 175 grain *tankas*, reconciling alike the *four*s of the Hindú ideal, with the *fives* and *tens* of Muslim predilection; but as there is reason to believe that the local gold was not refined up to a high state of purity, this defective standard may readily account for the corresponding reduction of a few grains on the full total of the silver pieces, equally as it may have justified the acceptance of a lower *touch* in the silver itself.

Later in point of time, under Bahádur Sháh (710-730 A.H.), the progressive fall in the value of gold is more definitively marked by the diminution of the weight of the silver piece to the uniform standard of 166 grains,‡ in contrast to the 169 grains which are preserved in some of the primary issues here described (Nos. 6, 7).

\* Pathán Chronicles, coin No. 207, p. 252. See also pp. 218, 219. I was mistaken in my first impression that the Bengal *tankas* themselves might have a claim to this obnoxious designation. J.R.A.S., II, 160.

† In Akbar's time, even, the progressive alteration in the value of gold, since so much accelerated, had only reached the proportion of 9.4: 1. Chronicles, p. 424. J.R.A.S., II, p. 68.

‡ Pathán Chronicles, p. 235. In my previous article in this *Journal*, I was led by

The central figure in the historical tableau, illustrated by these introductory coinages, stands prominently to the front in the person of Ghiyās-ud-dīn 'Iwaz—an outline of whose career I now append.

*Ghiyās-ud-dīn 'Iwaz bin Al-Husain.*

Husām-ud-dīn 'Iwaz *Khiljī*, a native of Ghor in Afghānistān, on joining Muhammad Bakhtyār Khiljī in Bengal, was entrusted by that commander with the charge of the district of Gangautrī.\* He was afterwards promoted to the important military division of Deokot,† by Qutb-ud-dīn Aibak's representative commissioner in the South-east, and with his aid eventually defeated Muhammad Sherān and the other confederated Khiljī chiefs.‡ On

Ibn Baṭūṭah's indiscriminate use of the terms "Dirhams and Dīnārs," in their local application in Bengal, to suppose that his definition of coin exchanges referred to the relative values of gold and silver, and that it in so far supported my estimate of 1 : 8 (J.R.A.S., II., p. 61, note 1). I now find that towards the close of Muhammad bin Tughluq's reign, the exchange had come for the moment to be 1 : 10 (Chronicles, p. 227), in lieu of the ordinary 1 : 8. The entire difficulty of the obscure passage in the Journal of the African Voyager has, however, been set at rest by the more comprehensive tables of values furnished by the Egyptian traveller Shuikh Mubārak *Anbālī* (Notices et Extraits, xiii., 51), which show that the *dīnār* of silver (*i. e.* the *tankah*) was equal to 8 *dirhams* (*hasht-kānī*). See also Elliot's *Historians*, iii., pp. 577, 582.

J.R.A.S. (N.S.), II., p. 157. The new and unworn pieces in the Koch Bihār *trouaille* averaged 166 grains; and the earlier issues, of 188, 189 grains, found with them, had generally been reduced in weight to correspond with the later official standard.

\* Variants کنکوری — کنکوری, Text, p. 158, and MSS. I have preserved Stewart's version of the name in my text, but the site of *Gangautrī* has not been identified. There is a town called Gurguri (21° 23'; 86° 55') on the line of country between Bihār and Nāgor, but it is not known to have been a place of any mark. There is also a celebrated fort of high antiquity on the same line of communication, named Gīdūr (24° 53'; 86° 55'), which may have served as an outpost of the Bihār head quarters.

† Deokot (lat. 25° 18'; long. 88° 31'), the chief place in Gangarāmpūr (district of Dīnājpur), is now known by the name of Daudamā. Hamilton states that "it received its present appellation from its having been a military station during the early Muhammadan Government" (p. 50). Muhammad Bakhtyār, after his first success against the King of Bengal at Nadiyā (that 23° 25'; long. 88° 22'), contented himself with destroying that town, and withdrew his troops nearer to his base of communications, to a position about 90 miles to the northward, somewhere about the site of the future Lak'hnaūtī, Deokot again being some 50 miles N.N.E.

Mīnhāj i Sirāj, in describing Lak'hnaūtī, at a later date (641 A.H.), mentions that the province lay on both sides of the Ganges, but that the city of Lak'hnaūtī proper was situated on the western bank. The author adds, that an embankment or causeway (ج) extended for a distance of ten days' journey through the capital from Deokot to Nāgor in Bīrbhūm, (lat. 23° 56'; long. 87° 22').—Stewart's *Bengal*, p. 57. Persian text of Ṭabaqāt-i Nāṣirī, pp. 161, 162, 248. *Āin-i-Akbarī*, ii. 14. Elliot's *Historians*, ii., p. 318, iii. p. 112. Rennell's *Map*, p. 55. Wilford, *As. Res.* ix., p. 72.

‡ The subjoined curious notice of the distribution of the boundaries of the kingdom of

the definite appointment of 'Alī Mardān Khiljī to the kingdom of Bengal by Quṭb-ud-dīn Aibak, he paid his devoirs to the new Viceroy by meeting him on the Kúsi, and accompanied him to Deokot, where he was formally installed in power. When Quṭb-ud-dīn died at Lāhor, in 607 A.H., 'Alī Mardān assumed independence under the title of 'Alā-ud-dīn; but after a reign of about two years, he was slain by the Khiljī nobles, and Husām-ud-dīn was thereupon elected in his stead (608 A.H.). History is silent as to when he first arrogated kingly state, and merely records Shams-ud-dīn Altamsh's expedition against him in 622 A.H., with the object of enforcing his allegiance to the Imperial crown, when, after some doubtful successes, peace was established on the surrender of 38 elephants, the payment of 80 *laks* [of *tankahs* ?], and the distinct recognition of Altamsh's suzerainty in the public prayers, with the superscription of his titles on the local coinage. The Emperor, on his return towards Dihlī, made over the government of Bihār to 'Alā-ud-dīn Jānī, who, however, was not long left undisturbed; for the Southern potentate speedily re-annexed that section of his former

Bengal shortly before the Muhammadan conquest has been preserved in Hamilton's 'Hindustan.' The compiler does not give his specific authority.

"During the Adisur dynasty, the following are said to have been the ancient geographical divisions of Bengal. Gaur was the capital, forming the centre division, and surrounded by five great provinces.

"1. Barendra, bounded by the Mahananda on the west; by the Padma, or great branch of the Ganges, on the south; by the Kortoya on the east; and by adjacent governments on the north.

"2. Bangga, or the territory east from the Kortoya towards the Brahmaputra. The capital of Bengal, both before and afterwards, having long been near Dacca in the province of Bangga, the name is said to have been communicated to the whole.

"3. Bagri, or the Delta, called also Dwīpa, or the island, bounded on the one side by the Padma, or great branch of the Ganges; on another by the sea; and on the third by the Hugli river, or Bhagirathi.

"4. Rarhi, bounded by the Hugli and the Padma on the north and east, and by adjacent kingdoms on the west and south.

"5. Maithila, bounded by the Mahananda and Gaur on the east; the Hugli or Bhagirathi on the south; and by adjacent countries on the north and west."

"Bollal Sen, the successor of Adisur, is said to have resided partly at Gaur, but chiefly at Bikrampur, eight miles south-east of Dacca." Bollal Sen was succeeded by Lakshmana Sen, who was defeated by Muhammad Bakhtiyār. The author continues, "it is possible that the Raja only retired to his remote capital, Bikrampur, near Dháká, where there still resides a family possessing considerable estates, who pretend to be his descendants. We also find that Soonerong, in the vicinity of Bikrampur, continued to be a place of refuge to the Gaur malcontents, and was not finally subjugated until long after the overthrow of Rájá Lakshmana."—Hamilton's *Hindustan* (1820) i, p. 114.

و چون او [محمد شیران] مهتر امرای خلیج بود همگان اورا  
Text, p. 158. خدمت می کردند و هرامیر بر اقطاع خود می بود.—Stewart's *Bengal*,  
p. 51. Elliot's *Historians*, ii, p. 815.

dominions,—an aggression which was met, in A.H. 624, by the advance of Nāqir-ud-dīn Mahmūd, the eldest son of Altamsh, in force, who, in the absence of Ghiyās-ud-dīn 'Iwaz on distant enterprises, succeeded in obtaining possession of the new seat of government. In the subsequent engagement, the Bengal army was defeated, and Ghiyās-ud-dīn killed, after a reign estimated by the local annalist at 12 years.\*

This is all the information we are able to gather from the incidental biographical notices furnished by our sole authority, Minhāj i Sirāj, that most intelligent employé of the rulers of Dihlī, and welcome visitor at the Court of Lak'hnaūtī in A.H. 641, where he saw and appreciated the material undertakings of this self-made king, whose memory he lauds enthusiastically. A tribute Altamsh had virtually anticipated, when he was at last permitted to behold the glories of his adversaries' capital, in 627 A.H., and then conceded the tardy justice of decreeing, that in virtue of his good works, Ghiyās-ud-dīn 'Iwaz should, in his grave, be endowed with that coveted title of *Sulṭān*, which had been denied to him while living.†

We have now to examine how far the recently discovered coins will fill in this defective historical outline.

#### COINS STRUCK IN THE NAME OF ALTAMSH, in Bengal.

No. 1. Silver. Size, 7½. Weight, 168 grains. *Unique*, in this date.

Pl. x. fig. 1. A.H. 614.

OBVERSE.

السلطان المعظم

شمس الدنيا والدين

ابوالمظفر العيش القطبي

ناصر امير المومنين

REVERSE.

*Devicé.*

Horseman at the charge.

*Margin—*

لا اله الا الله [محمد] رسول الله

بقرآن سنة اربع عشر وستمائة

\* Allowing 'Alī Mardān from 607—8 to 609—10, this leaves an interval up to 612 during which Husām-ud-dīn 'Iwaz was content to remain head of the Khiljī oligarchy and local governor.

† Ṭabaqāt-i Nāqirī, Text, p. 163. Mr. Blochmann has an interesting paper, in the September number of the *Indian Antiquary* (p. 259), on Muhammadan Titles. Among other questions discussed is the derivation and early application of the title of *Sulṭān*. The author remarks that "the first clear case of *Sulṭān* having been used as a title belongs to the time of Rukn-ud-daulah, deputy over Fārs, under the Khalīfah Al Muṭf billah," A.H. 338, or A.D. 949. MM. Oppert et Ménant were under the impression that they had discovered the title so early as the time of Sargon, who, in his grand inscription at Khorāshād, is said to speak of Subaco as "*Sulṭān*, or Sultān d'Egypte."—*Journal Asiatique*, 1863, p. 9, and *text*, p. 3. Commentary, 1864, p. 10. Some doubt has, however, since been thrown upon this identification, as the designation reads optionally, if not preferably, *Ṭarṭān*. Schröder, *Cuneiform and Old Testament Studies* (1872), p. 157.



The date of A.H. 614, this earliest numismatic record contributed by the Bengal mints, is further remarkable as the epoch of Altamsh's final assertion of supremacy on the defeat of his last powerful competitor in Hindústán, Naçir-ud-dín *Qubâchah*, after he had already disposed of his other prominent rival, Táç-ud-dín Ilduz, in 612 A.H. The issue of these provincial coins, at this conjuncture, would seem to attest the first voluntary recognition of Altamsh by Husâm-ud-dín 'Iwaz, who was at this time in undisturbed possession of Bengal and its dependencies. The adoption of the Cavalier device on the obverse may have been suggested by the conventional acceptance of that design on the money of the native princes of the North-west, whose hereditary types were copied by Muhammad bin Sâm, and retained for a long period by Altamsh himself. In the new mintage, however, the Rájput horseman with his spear is superseded by the Túrki Cavalier with the historical mace,\* and the general outline of the coarse Northern steed may perchance have been heightened to record a triumph, or to carry a menace to the subjected Bangális,† who had left their king to escape ignominiously, and virtually surrendered their capital to the eighteen troopers of Muhammad Bakhtýár's advance guard.

Among other peculiarities of these coins is the tenor of their legends, which differ from the ordinarily adopted Imperial intitulations of the Sultán, who is here designated as *القطبي*, the slave or freedman of Qutb-ud-dín Aibak, —a term which may have concealed a latent taunt to one who was now supreme in the chance virtue of his arms, or may otherwise indicate the independent Khiljí method of discriminating the followers of Qutb-ud-dín.

\* Mahmúd of Ghazní's favourite weapon. Tradition affirms that it was preserved in all honour by the guardians of his tomb at Ghazní. (Atkinson, *Expedition into Afghánistán*, p. 222). So much credence was attached to this ancient legend, that we find Lord Ellenborough in 1842 instructing his generals in sober earnestness, to "bring away from the tomb of Mahmúd of Ghazní his club which hangs over it." Muhammad Bakhtýár himself had also won glory by the use of his mace in his gladiatorial encounter, single-handed, with an elephant, who was compelled to retreat before the first blow of his powerful arm.

† The name of *Aswapatis*, "Lords of Horses," was subsequently applied specifically in Orísá to the Muhammadan conquerors. Mr. Hunter remarks, "The Telugu Palm Leaf MSS. state that between (Saka 895) A.D. 972 and A.D. 1563, three great powers successively arose. During this period, the *Gajapatis*, 'Lords of Elephants,' ruled in Orissa and the north of Madras; the *Narapatis*, 'Lords of Men,' held the country to the southwards. The Lords of Horses were the Musalmáns, who, with their all-devouring Pathán cavalry, overthrew the two former."—Orissa, ii., p. 8. Stirling, *Asiatic Researches*, xv., p. 254. *Kin-i-Akbari*, Gladwin's translation, i., p. 819. Abul Fazl, in describing the game of cards, affected by his royal master, speaks of "*Ashwopeut*, the king of the horses. He is painted on horseback, like the king of Dehli, with the Chutter, the Alum, and other ensigns of royalty; and *Gajput*, the king of the elephants, is mounted on an elephant, like the king of Orissa."

as opposed to the Mu'izzi faction of the nobles of Hindústán, who had already tried conclusions with each other, to the disadvantage of the latter.

No. 2. Gold. Weight, 70·6 grains. *Unique. Gaur, A.H. 616.\**

## OBERSE.

## REVERSE

المعظم

Horseman at the charge.

شمس الدنيا والدين

In the field—فرب نكور

ابو المظفر الشمس

*Margin—*

القبطي - رهان

لا \* \* \* رسول الله بتاريخ سنه

امير المؤمنين †

ست عشر وستمائة

This unique gold coin of the period, put forth under Muslim auspices, is of more than usual value in confirming the locality of the mint of its counterparts in silver, which are deficient in any geographical record; indeed, none of the Bengal coins, which form the bulk of the *trouvaille* to which the present notice is devoted, bear any indication of the site of which they were struck. Found, however, in company with so many clearly local pieces, there would have been little hesitation in assigning them to the southern division of the new Muhammadan empire; but the distinct announcement of the place of issue of the gold piece is of importance, not only in fixing definitively the then head-quarters, but in presenting us with the name of *Gaur*,† regarding the use of which, at this epoch, there was

\* For a figure of the coin, *vide* *Chronicles of the Pathán Kings*, p. 78.

† Qilij Arsalán, the Saljúq of Anatolia (A.H. 656), uses this title of *برهان امير المؤمنين* (Fræhn, p. 156). The three sons of Kai Khusráu (A.H. 647) employ the term in the plural *براهين*.

‡ I need have no hesitation in admitting that on the first examination of this piece, as an isolated specimen of a hitherto unknown mintage, I was disposed, in the absence of any dot either above or below the line of writing, to adopt the alternative reading of *فرب نكور* instead of *بكور*, while confessing a preference for the latter transcription, on account of the need of the preposition *ب* (*Chronicles of the Pathán Kings*, p. 79); but, at the time, I was unprepared to expect that Altamsh's sway had extended to the lower provinces, which were avowedly in independent charge of the Khiljí successors of Muhammad Bakhtyar. This difficulty is now curiously explained by the concurrent silver pieces, and the supposition that the local chieftain found it expedient to profess allegiance, nominal or real, to the preponderating influence of the master of Hindústán. In like manner, the recently discovered silver coins have supplied a clue to the more satisfactory decipherment of the marginal legend, and the explanation of other minor imperfections in the definition of the exotic characters of the gold coin, which it is useless to follow in detail.

some controversy.\* Advantage has been taken in this, to the native comprehension, more elaborately-finished piece, to insert in the vacant spaces on the field, above and below the main device, the words, ضرب بگور "struck at Gaur," and although the requisite dot below the *be* has escaped definition, there need be little doubt as to the purport of the entry, which it was not thought necessary to reproduce on the less-esteemed silver money, whose status with the mint officials, as equally with the public at large, ranged at a lower level.

The date of 616 A.H. on this coin, supported and in a measure explained as it is by the marginal legend on No. 3, proves that the professed allegiance of the local ruler of Bengal to the head of the followers of Islám at Dihlí, was no momentary demonstration, but a sustained confession of vassalage extending over one complete year, and portions of the previous and succeeding twelve months.

The topographical record on No. 2 would further seem to show that. Husám-ud-dín had not as yet transferred his capital to the new site of *Lak'hnaúti*, to the west of the river, whose designation first appears in a definite form on the coins of the Empress Raziyah, in A.H. 635.†

No. 3. Silver. Size, 7. Weight, 168 grains. *Very rare.*

Pl. x. fig. 2. A.H. 616.

| OBVERSE.                         | REVERSE.                                            |
|----------------------------------|-----------------------------------------------------|
| السُّلْطَانُ الْمُعْظَمُ         | Horseman at charge.                                 |
| شَمْسُ الدُّنْيَا وَالدِّينِ     | <i>Margin—</i>                                      |
| أَبُو الْمُظْفَرِ الدِّمَشْقِيُّ | لَا إِلَهَ إِلَّا اللَّهُ مُحَمَّدٌ رَسُولُ اللَّهِ |
| الْقُطْبِيُّ بَرْهَانُ           | بَنَارِجٍ مِنْهُ سِتْ عَشْرُ سَنَابِهٍ              |

No. 3a. Variety. Weight, 162 grs. Pl. x., fig. 3. Date illegible. The Persian legend on the obverse is given in very imperfectly defined characters, and offers the peculiarity of the insertion of the Hindí letters श, for *Sháh*, above the name of the king, thereby indicating that both die-engravers and the local public were naturally better versed in the old alphabet than in the newly-imported letters of the conquerors.

\* J.R.A.S. ii., n.s., p. 187. Cf. also Albirúní; Reinaud, *Mémoire sur l'Inde*, p. 298, quoted in J.R.A.S. i., n.s., p. 471. As. Res. ix., 72, 74; xvii. 617. Wilson's *Glossary*, *sub voce*, etc. Rennell, *Map of Hindústán*, p. 56. Stewart's *Bengal*, pp. 44, 57.

† *Chronicles of the Pathán Kings*, p. 107. J.R.A.S., n. s., II., p. 187, coin No. 14 *infra*.

## COINS OF GHIYÁ'S-UD-DÍN 'IWÁZ.

No. 4. Silver. Size, 7½. Weight, 161 grs. (full weight.)

Pl. x., fig. 4. A.H. 616. (7 specimens.)

| OBVERSE.           | REVERSE.                 |
|--------------------|--------------------------|
| السلطان            | لا اله الا               |
| المعظم غياث الدنيا | الله محمد                |
| و الدين ابو الفتح  | رسول الله                |
| عوض بن الحسين نامر | Margin— ضرب هذه السكة في |
| امير المؤمنين      | شهر سنة ست عشرو ستمائة   |

Coin No. 4 teaches us that in the same year 616 A.H., in the early part of which Husám-ud-dín 'Iwáz had confessed allegiance to Altamsh, he seemingly grew weary of such pretences, and openly declared himself *Sulṭán* in his own right, assuming the regal title of *Ghiyás-ud-dín*, and the quasi-hierarchical function implied in the designation of *Nāṣir Amír Al Múminín*, "Defender of the Commander of the Faithful." Whether this overt assertion of independence was suggested by his own growing power, or was due to the imagined weakness of the suzerain, is not clear; but there can be no question as to his success in the extension and consolidation of his dominions, or to his vigorous administration of a country, fertile in the extreme, and endowed with such singular commercial advantages of sea and river intercourse.

At this particular juncture, Altamsh does not seem to have been pressed by any important home disturbances, but there were dark clouds on the N. W. frontier. The all-powerful 'Alá-ud-dín Muhammad *Khárazmí*, whose outpost extended over so large a portion of Asia, had been coining money in the inconvenient proximity of *Ghazní* throughout the years 613, 614-616, A.H.;\* and no one could foretell when he might follow the ordinary precedent and advance into Hindústán. As fate determined, however, it was left to his son *Jalál-ud-dín* to swim the Indus, at the risk of his life, as a fugitive before the hosts of Chingíz Khán, in 618 A.H.

The mention of *Chingíz Khán* suggests to me the desirability of repeating a correction, I have already recorded elsewhere, of a singular delusion, shared alike by native copyists and English commentators, regarding one of the supposed incidents of the sufficiently diversified career of this scourge of the world, to the effect that his unkempt savages had penetrated down to the impossible limit of the lower Ganges. The whole series of mistakes, Asiatic or European, may now be traced back to a simple clerical error in the transcription from a chance leading copy of the ordinarily rare work of Minháj i Siráj—where the name of *Chingíz Khán* جنگیز خان has been substituted for the more obvious designation of the ancient town of *Jájnagar* جاجنगर.

\* J.R.A.S. ix., 381; xvii., 202; *Chronicles of Pathán Kings*, p. 86.

Modern authors, examining a single passage, might well have felt reserve in reconstructing at hazard a primary version; but the editors of the Calcutta official printed text have gone so far towards perpetuating the enigma they were unable to unravel, as to add to the difficulties of solution by making Chingiz Khán fight (so far on his way to Lak'hnaúti) the memorable battle of Perwán [30° 9' N., 69° 16' E.] on the conveniently converging site of Badáon (p. 348), which was situated on one of the favourite main lines of transit to the south, east of the Ganges. This conglomeration is, however, the less excusable, as Stewart, in his *History of Bengal*, had already pointed out Ferishtah's palpable mistake to the same effect; and the editors themselves unconsciously admit the preferable variant of جاجنكر inserted in the foot-note, p. 199. Dr. Hunter, I see, in his new work on Orissa (ii. 4), incautiously follows Stewart's first impressions, in the notion that the "vanity" of Muhammadan historians had intentionally "converted the attack of the humble Orissians into an invasion of Tartars" (Stewart, p. 62).\* I myself prefer the more obvious and direct explanation above given, which perhaps reflects more upon our defective criticism than upon Muslim vanity.†

\* Mr. Stirling, in his most exhaustive *Memoir on Orissa*, published in the *Asiatic Researches* in 1822, observes:—"Major Stewart, in his *History of Bengal*, places an invasion of Orissa by the Mussalmans of Bengal during this reign, that is A.D. 1243. The *Chronicles* of the country contain no mention of such an event. I have not Major Stewart's authorities at hand to refer to, but strongly suspect that he has been led into an error by mistaking some word resembling Jajipur, for Jajipur in Orissa. He expresses himself thus: 'In the year 614 (A.D. 1213), the Raja of Jagepur (Orissa) having given some cause of offence, Toghan Khan marched to Ketason, on the frontier of Jagepur, where he found the army of the Raja had thrown up intrenchments to oppose him'. . . . Now, in the first place, Jajipur was never a separate principality, as here described; and there is no such place in Orissa as Ketason. Ferishtah is altogether silent on this subject in his history of Bengal, but in his general history he ascribes the siege of Gour, in the very year in question, to a party of Mogul Tartars who had invaded Bengal by way of Chitta, Thibet, etc. Dow's mistake of a similar nature is scarcely worth noticing. He makes Sultan Balin pursue the rebel Toghrul into Jajunagar (A.D. 1279), which he calls *Orissa*, whereas it is evident from the mention of Sunarguon as lying on the road, that Jájúnagar is some place beyond the Ganges."—Stirling, *As. Res.* xv., p. 274.

It seems to have escaped Mr. Stirling's notice, that Stewart had already corrected his own error in speaking of "Jagepore" as "Orissa," pp. 61 and 65, by placing that town in its proper position in "Tippesah," in a later passage (p. 70); and he further improved upon his advanced knowledge by saying in a note, at p. 72, "Jagenagar is said to have been a town in Orissa, near Cuttack; but this passage proves it to have been situated on the eastern side of the Burhampooter. The Jagenagar mentioned by Ferishtah should have been written Jagepore." [?] Stewart, *Hist. Bengal*, p. 72. Dow, i. 202 (4to. edit.). Briggs i., 260. See also *Chronicles of Pathán Kings*, p. 121.

† Cf. Elphinstone (new edit. by Professor Cowell), p. 377. Elliot, *Muhammadan Historians* ii., pp. 264, 344, Dr. Lee's Ibn Batútah, *Oriental Tr. Fund*, p. 97. Ferishtah

No. 5. Silver. Size, 8½. Weight, 165 grs. A.H. 617.  
(2 specimens.)

| OBVERSE.             | REVERSE.                   |
|----------------------|----------------------------|
| السلطان              | لا إله إلا الله            |
| المعظم غياث الدنيا   | الله محمد رسول             |
| والدين أبو الفتح عوض | لله                        |
| بن الحسين ناصر أمير  | ضرب هذه السكة في           |
| المومنين             | التاريخ السابع عشر وستمائة |

No. 6. Silver. Size, 8. Weight, 160. (Coarse badly formed legends).  
A.H. 617. (2 specimens.)

| OBVERSE.                | REVERSE.                 |
|-------------------------|--------------------------|
| السلطان الاعظم          | لا إله إلا الله          |
| غياث الدنيا والدين      | محمد رسول الله           |
| أبو الفتح عوض بن الحسين | الناصر لدين الله         |
| ناصر أمير المومنين و    | أمير المومنين            |
| ولي عهده علا الحق       | ضرب هذه السكة في         |
| والدين                  | شهر سنة سبع عشرة وستمائة |

No. 6a. Variety. One example gives the altered marginal reading of

ضرب هذه السكة في ربيع الآخر سنة سبع \* \* ستمائة

Al Nāṣir li-din Illāh was invested in the Khilāfat in A.H. 575, and died on the 1st Shawwāl, A.H. 622 (5th October, 1225, A.D.). Bar Hebræus, *Abulfaraj*, pp. 269-301. Ibn Aṣīr, p. 285, fixes his death at the end of Ramazān. Price, *Muhammadian History*, ii., 210.

The tenor of the legends of the consecutive issues of A.H. 617 disclose an increasing confidence in his own power on the part of *Ghiyās-ud-din 'Iwaz*, in the addition made to his previous titles, and in the assumption of the superlative *Al A'zam*, "the highest," as the prefix to the *Al Sulṭān* in place of the heretofore modest adjective of *Al Mu'azzam*, "the great."\*

*Bombay Persian Text*, i., p. 122. Badāonī, *Calcutta Persian Text*, p. 88. *Ṭabaqāt i Nāṣiri*, *Calcutta Persian Text*, pp. 157, 163, 199, 243, 245.

\* Altamah himself seems to have been indifferent to this distinction, but its importance is shown in the early coinage of Muhammad bin Sām, who invariably reserves the superlative prefix for his reigning brother, while he limits his own claims to the virtually comparative المعظم. And further to mark these gradations, he prominently adopts the higher title after his brother's death. *Chronicles of Pathān Kings*, pp. 12, 13, 14. *Ariana Antiqua*, pl. xx., figs. 29, 35.

Here, for the first time in this series, we meet with the official or regnant designation of the Khalfah of Baghdád, who has hitherto been referred to by the mere generic title of "Commander of the Faithful."

It would appear from this innovation, as if Ghiyás-ud-dín had already, indirectly, put himself in communication with the Pontifical Court at Baghdád, with a view to obtaining recognition as a sovereign prince in the Muslim hierarchy,—a further indication of which may possibly be detected in the exceptional insertion of the *month* in addition to the ordinary *year* of issue on the margin of No. 6a.; a specification which will be found more fully developed in the succeeding mintages, where it admits of an explanation which is not so obvious or conclusive in this instance.

No. 7. Silver. Size, 9. Weight, 169 grs. Pl. x., fig. 5.\* Dated 20th of Rabí' ul ákhir, A.H. 620. (7 specimens.)

## OBYERSE.

غياث الدنيا  
والدين ابو الفتح عو  
ض بن الحسين قسيم امير المومنين  
سلطان السلاطين في الدنيا  
والدين ابو المظفر على يده  
امير المومنين  
خلد الله ملكه

## REVERSE.

لا اله الا الله  
محمد رسول الله  
الناصر لدين الله  
امير المومنين  
في التاريخ العشرين — Margin  
من شهر ربيع الآخر سنة  
عشرين و ستماية

No. 7a. Variety. Weight, 165 grs. Coin of the same date and similar character, which transfers the complete name of عوض into the third line; the dubious prefix to the second الدين و الدنيا reads more as معز, while the suggested يده, above given, appears as يدنو.

If the preceding coins had left any doubt as to Ghiyás-ud-dín's designs in regard to the assumption of sovereign power, the tenor of the legends on Nos. 7 and 7a, would conclusively set that question at rest. Here, not content with the recently-arrogated title of السلطان الاعظم, we find him calling himself "*Sultán of Sultáns*," by direct appointment of the

\* See also Marsden, No. DCCLVII, p. 564. There are two coins of this type in his collection in the British Museum. Marsden remarks, "The date of this coin, the earliest of those belonging to the princes who governed Bengal in the name of the Kings of Dehli, but who took all opportunities of rendering themselves independent, is expressed distinctly in words. . . . The titles and patronymics of the Sultán by whom it was struck are for the most part illegible; not so much from obliteration, as from the original imperfect formation of the characters."

Khalifah,\* associated with which is the entry of a specific date, with the still more unusual definition of the day of the month, which is preserved constant and unvaried throughout the entire issue. More remarkable still is the abnormal departure from the conventional form of coin legends, in the omission of the preliminary "*Al Sulṭān*," and the abrupt introduction of the regnal title of the once probational *Husām-ud-dīn*, under his more ambitious designation of *Ghiyās-ud-dīn*. In short, the entire drift of the altered superscription points to an intentional reproduction of some formal phraseology, such as would be eminently consistent with an official transcript of the *revered* precept emanating from Baghdād.

I should infer from these coincidences that a formal diploma had by this time been conceded by the Supreme Pontiff, admitting the newly-erected kingdom Bengal within the boundaries of Islām, and confirming the reigning monarch in possession, with added titles and dignities. The date so prominently repeated may either be that upon which the patent was originally *sealed*, or more probably it points to the auspicious moment of the reception of the ambassadors, who conveyed the formal document and paraphernalia of investment, at the Court of Lak'hnaūtī. This assignment in no way disturbs my previous attribution of the inaugural piece of 'Altamsh,† marking his attainment of the like honours in A.H. 626. The very concession to the Bengal potentate possibly led his once suzerain to seek a parallel sanctification of his own rights, which he had previously been content to hold by the sword: and the difficulty of communication with Baghdād over alien kingdoms and disturbed frontiers would account for a delay of the emissaries on the one part and the other, which would not affect the open ocean passage between the mouths of the Ganges and the sea-port of Baḡrah.

\* The term *علي بدي* is of frequent occurrence on the early Muslim coinages, and is usually associated with the name of the officer—whatever his condition—responsible for the mint issues, as *علي بدي احمد*, which is translated by Fræhn as "*manibus*" (*i. e. curā et operā*) *Ahmadis* or "*curante*,"—a definition accepted in later days on the Continent as "*par les mains de, par les soins de*, etc. In the present instance it would seem to imply a more or less direct intervention by the Commander of the Faithful himself in favour of his nominee.

† Initial Coinage of Bengal, J.B.A.S. ii., n.s., p. 154, No. 1, *note*; *Chronicles of the Pathān Kings*, p. 46. Of course, this exceptional issue will now have to cede priority of date both to the Bengal coins of A.H. 614, etc., and likewise to the northern piece of Altamsh, No. 8, which must be taken as anterior to No. 10.



## COIN OF ALTAMSH.

No. 8. Silver. Size  $8\frac{1}{2}$ . Weight, 168 grs. Square Kufic characters, which seem to belong to Láhori or some northern Mint.\* Pl. x., fig. 6. A.H. 622\*.

| OBVERSE.           | REVERSE.            |
|--------------------|---------------------|
| السلطان            | لا اله الا الله     |
| المعظم شمس         | محمد رسول           |
| الدنيا والدين      | الله الناصر لدين    |
| ابو المظفر ايلنمش  | الله امير المو      |
| السلطان يمين خليفه | منين                |
| الله ناصر امير     | هذا الضرب ؟ Margin— |
| المومنين           | عش [رين وست مائه    |

BENGAL COINS OF ALTAMSH SUBSEQUENT TO THE RE-ASSERTION OF HIS IMPERIAL SWAY.

No. 9. Silver. Size 8. Weight, 161 grs. Bengal type of coin. A.H. 622.

| OBVERSE.                | REVERSE.                                    |
|-------------------------|---------------------------------------------|
| السلطان                 | As in Nos. 6 and 7,—coins of                |
| المعظم شمس الدنيا و     | Ghiyás-ud-din, with the name of             |
| الدين ابو المظفر ايلنمش | the Khalifah <i>Al Nāṣir-li-dīn Illāh</i> . |
| السلطان يمين خليفه      | Margin—                                     |
| الله ناصر امير المو     | هذا الضرب † في شهر سنة اثني                 |
| منين                    | عشرين وستمائة                               |

Altamsh does not seem to have found it convenient to proceed against his contumacious vassal, who was now ready to meet him on almost equal terms, till A.H. 622, when the coinage immediately attests one part of the compact under which peace was secured, in the exclusive use of the name

\* Chronicles of the Pathán Kings, p. 15. Pl. i., figs. 4—8.

† This word as designating the coin is unusual; but we have the term *دبر الضرب* for the Mint, and the *ضرب* هذه, etc., as the ordinary prefix to the *الفضة* or *السكة* of the Pathán monarchs. The letters on the Bengal coins look more like *الغرب*, which, however, does not seem to make sense. Fræhn long ago suggested that the word *ضرب* ought to be received as a substantive, especially in those cases where the preposition *ب* did not follow it, in the given sentence, as a prefix to the name of the mint city.

of the Emperor of Hindústán on the money of Bengal.\* That the issue represented by No. 9, proceeded from the local mints, is evident alike from the style and fabric of the pieces, their defective metal, and the uncouth forms of the letters of the legends.

No. 10. Silver. Size 8. Weight 168 grs. (2 specimens.) Pl. x., fig. 7, A.H. 624.

## OVERSE.

السلطان الاعظم  
شمس الدنيا و الدين  
ابو المظفر ايلدش  
السلطان ناصر امير  
المومنين

## REVERSE.

لا اله الا الله محمد  
رسول الله  
الظاهر ناصر الله  
امير المومنين  
ضرب هذ \*\*\* شهر سنة اربع  
وعشرين و ست مائه

Al Zâhir bi-amrillah, the Khalîfah whose name is inscribed on this coin, succeeded his father on the 2nd of Shawwâl, A.H. 622, and died on the 14th Rajab, A.H. 623 (July 11, 1226, A.D.). Bar Hebraeus, *Abulfaraj*, p. 302.

No. 11. Silver. Size, 7. Weight, 167 grs. *Unique*. Pl. x., fig. 8, A.H. 624.

Square area, within double lines, following the pattern of some of the examples of Muhammad Ghori's coins.

السلطان الاعظم  
شمس الدنيا و الدين  
ابوالمظفر ايلدش  
السلطان ناصر

The words امير المومنين are inserted in the interstices between the square area and the circular marginal line, as in the Dihli coins of Bahram Shâh.†

## REVERSE.

Legend in the area as in the last coin, with the name of the Khalîfah *Al Zâhir*.

ضرب \*\* سنة اربع  
وعشرين ت مائه

\* غياث الدين عوفى خلجي رقبه خدمت در ريقه انقياد آورد و مي [سي و هشت]  
زنچير پيل و هشتاد لك مال بداد و خطبه و سكه بنام مبارك شمسى كرد

Calcutta text, pp. 163, 171.

† Chronicles of the Fathân Kings, p. 118.

It might be supposed to be an open question as to whether Ghiyás-ud-dín 'Iwaz or Náçir-ud-dín *Mahmúd*,—the eldest son of Altamsh and his viceroy in Bengal—presided over the mints which put forth the coins classed under Nos. 10 and 11. As regards the latter, at present *unique*, piece, there can be little doubt, from its assimilation to the ordinary Dihlí models, that it formed a portion of the revised and improved coinage of the south after Mahmúd's defeat of Ghiyás-ud-dín in 624 A.H. In like manner, the introduction of the term *الاعظم* on No. 10, as a prefix to the title of *Sulṭán* Altamsh, points to a feeling of filial reverence, which is altogether wanting even in Ghiyás-ud-dín's repentant manifesto in the legend of No. 9. Mahmúd's appointment to the government of Audh dates from A.H. 623,\* and the tenor of one of the narratives of Minháj i Siráj would imply that he proceeded southwards with but little delay; so that all coins bearing the date of 624, with the name of Altamsh, might preferentially be assigned to his interposition, more especially as Ghiyás-ud-dín at, and prior to this, period had placed himself in a renewed attitude of insurrection.

*Coin of Náçir-ud-dín Mahmúd Sháh, as Viceroy in Bengal.*

The administration of the Bengal mints under the official auspices of Náçir-ud-dín *Mahmúd*, as developed in the issues Nos. 10, 11, leads up to and confirms with more full effect an identification I have hitherto been obliged to advocate in a less confident tone—that is, the attribution of the piece, figured in my 'Chronicles of the Pathán Kings,' p. 81, to the eldest son of Altamsh, at some period towards the close of his brief career. With these newly-discovered evidences of his overt intervention in the local currencies, the transition to a subdued and possibly paternally-sanctioned numismatic proclamation, in his own name, would be easy, more especially if that advance was made simultaneously with the effusive reception at Dihlí of the reigning Khalfah's earliest recognition of Altamsh's supremacy, coupled with the desirability of making this Imperial triumph manifest in those southern latitudes, where other dynastic names had already claimed a prior sanctification.†

\* Persian text, 180.

† Minháj i Siráj, after completing his account of Náçir-ud-dín's conquest of Ghiyás-ud-dín 'Iwaz, and the transmission of the spoils to the Sulṭán at Dihlí, continues—

و چون تشریفات دار الخلافه بحضور سلطان شمس الدین طاب ثرا  
رسید از آنجمله يك تشریف گرانمایه با چتر لعل بطرف لکهنوتی فرستاد ملك ناصر  
الدین علیه الرحمة بدان چتر و تشریف و اکرام مشرف گشت و همگان را از ملوک  
و اکابر مملکت هند نظر بدو بود که وارث مملکت شمسی او باشد . فاما \* \* بعد از  
یکسال و نیم \* \* بر حمت حق تعالی پیوست . p. 181

(See also Elliot's *Historians*, ii., pp. 326, 329.) The Khalfah's emissary arrived at Dihlí on the 22nd of Rabī'-ul-Awwal, (3rd month of) A.H. 626, p. 199, and news of the death of Náçir-ud-dín Mahmúd reached the capital in the 5th month of the same year, p. 174.

Such an authorized augmentation of the Prince's state is rendered the more probable, as Altamsh in a measure shared with his favourite son the honours and dignities conferred by the Khalifah, and simultaneously extended to him the right to use an umbrella with the tint of Imperial red.\* Nágir-ud-dín Mahmúd, the contemporary biographer remarks, was from that time looked upon as the recognized successor to the throne of Hindústán. Equally, after Mahmúd's premature death, his father still so held him in honour that his body was brought to Dihlí, and enshrined under one of the choicest domes that Eastern Saracenic art could achieve, which to this day, amid its now broken marbles, stands as a monument of the virtues of this prince, and preserves in its decaying walls the remains of† the *first* royal tomb of the slave kings erected near the capital,‡ on the shattered entrance arch of which we can still trace the devotional prayer of the father for the soul of his son, whose mundane glories he briefly epitomizes as "King of Kings of the East," implying, in the conventional terms of the day, all India beyond the Ghagra.

And still further to secure a contemporary memento of his lost heir, Altamsh conferred the same name and title upon a younger son, who, in his

\* The founder of the Ghaznawí dynasty, the Great Sabuktigín, assumed regal state under the shadow of a *red* umbrella. Altamsh's ensigns are described as *black* for the right wing رايات ميمنه سياه, and *red* for the left wing رايات ميسره لعل. Mu'izz-ud-dín Muhammad bin Sam's standards bore the same colours, but the discrimination is made that the *black* pertained to the Ghóris, and the *red* to the Túrks, p. 127. Ghiyás-ud-dín Muhammad bin Sam used *black* and *red* for the two wings respectively, p. 83.

† INSCRIPTION ON THE TOMB OF SULTÁN GHÁZÍ [NA'SIR-UD-DÍN MAHMÚD] AT DIHLÍ, DATED A.H. 629.

امر ببناء هذه القبة المباركة السلطان المعظم شاهنشاه الاعظم مالك رقاب  
الاعم ظل الله في العالم ذو الامان لاهل الذمة سلطان لسلطين شمس الدنيا  
والدين المخصوص بعنايت رب العالمين ابي المظفر بلشاه السلطان ناصر امير  
المؤمنين خلد الله ملكه اروضة ملك الملوك الشرق ابي الفتح محمود تعمود الله  
بغفرانه واسكنه كنف نعيم جنانه في شهر منه تسع و عشرين و ستماية ١١

This Tomb, which is known at the Maqbarah of Sultán Gházi, stands amid the ruins of the village of Malikpúr Koyi, about three miles due west of the celebrated Qutb Minár. *Kábir-us-Sanádíd*, Dihlí, 1854, pp. 23, 30 (Nos. 12, 18, Facsimile), and 60 (modern transcript revised). See also *Journal Asiatique*, M. G. de Tassy's translation of the *Urdu* text; also *Journal Archaeological Society of Dehli*, p. 57, and *Hand-book for Dehli*, 1863, p. 85.

‡ Rukn-ud-dín Firúz Sháh, another son of Altamsh, who for a brief period held the throne of Dihlí, found a final resting-place on the chosen site of Malikpúr; and his brother in deferred succession, entitled Mu'izz-ud-dín *Bahrádm Sháh*, followed him into the Tomb of the Kings in the same locality.—*Kábir-us-Sanádíd*, pp. 25, 26. Elliot's *Historians*, iii, 382. *Chronicles of Pathán Kings*, p. 290.



Suffice it to say that *Daulat Sháh bin Maudúd* is the person who is spoken of elsewhere as Ikhtiyár-ud-dín *BALKÁ*\* *Khilji*, and who appears in history on the single occasion of his possessing himself of the kingdom of Bengal on the death of Náçir-ud-dín Mahmúd, and his subsequent suppression and capture on the advance of Altamsh's forces in the selfsame year, 627 A.H., he was unwise enough to record on his unauthorized coinage.

No. 13. Silver. Size 9½. Weight., 168. *Unique*. Plate x., fig. 9.  
A.H. 627 ?

| OBVERSE.                  | REVERSE.                          |
|---------------------------|-----------------------------------|
| المستنصر بالله            | السلطان                           |
| امير المؤمنين السلطان     | العدل شهنشاه نازل                 |
| الاعظم شمس الدنيا و الدين | علا الدنيا و الدين ابوالغازي      |
| ابوالفتح ايلدش السلطان    | دولتشاه بن مودود                  |
| برهان امير المؤمنين       | عضد خليفه الله ظهير امير المؤمنين |
|                           | Margin — شهر سنه سبع              |
|                           | عشرين و ستياه                     |

The reading of *ابوالغازي* is speculative: the letters *العا* are distinct, as are also the two dots of the *ي*, but that latter *itself* cannot be traced, and the visible remains of the character succeeding the *العا* are more like *لي* than the suggested *زي*.

سلطان سعيد شمس الدين چون بديار لكهنوتي رسيد بعد از فوت ملك ناصر الدين  
محمود طاب ثراه و دفع فتنه ملك اخنيار الدين بلكا Calcutta Text, p. 162

In the printed text, under the *first* Court Circular list of the *اقرباء و ملوك* of Sultan Shams-ud-dín, we find the following entry *دولت شاه خلجي ملك لكهنوتي*; and in the *second* document, purporting to be a variant of that official return, we read *بلكا خلجي* (pp. 177 and 178), which latter version is greatly improved by the Oriental Lord Chamberlain's list preserved in a MS. in the B. M. (Addit. No. 26,189), which associates more directly the *title* with the *name*, and identifies the individual as *ملك اخنيار الدين دولتشاه بلكا*.

\* The word *Balká* has exercised the commentators. It may be found, however, in the early Ghaznawí name of *Balká-tigin*. *بلكا* means a "camel colt," and *نگهن* is "handsome."







# APPENDIX

TO THE

*Journal of the Asiatic Society of Bengal,*

VOL. XLII,

PART I., FOR 1873.

CONTAINING

VOCABULARIES OF NÁGÁ HILL TRIBES,

*by Capt. J. BUILER and S. E. PEAL, Esq.*

*A Rough Comparative Vocabulary of some of the Dialects spoken in the "Nágá Hills," District.—Compiled by Captain JOHN BUTLER, Officiating Political Agent.*

The plan I have adopted for designating the long sound of all vowels has been by placing an accent immediately over the vowel; thus á is pronounced like the Italian *a*, or like the English long *a* as pronounced in such words as "mast," "father," "ask," &c.

é like the English *e* in "fate," or *e* in "prey," "convey," &c.

í in like manner has the sound of the French *i*, or English *ee* as in "peep," or *i* as it is pronounced in such words as "fatigue," "marine," &c.

ó as the *o* in "notice"; and finally

ú similarly to the English long *o* as in "move," "prove," &c, or *oo* as in "school," "tool," "fool," &c.

[Appendix,

| English.                         | Assamese.            | Kachári.     | Mikir. | Kúki.             | Angámi Nágá.  | Rengmá Nágá. | Kutchá Nágá. |
|----------------------------------|----------------------|--------------|--------|-------------------|---------------|--------------|--------------|
| A, an, or one, <i>a</i> .        | Etá,                 | Sáosi, Mási, | Isi,   | Khat,             | Po,           | Kémme,       |              |
| Abandon (let-<br>go), <i>v</i> . | Eridé,               | Háigár,      | Honkí, | Lhatan,<br>létan, | Dhá-Khasiché, |              |              |
| Abdomen, <i>n</i> .              | Tolpét,              | Hoh,         | Ipoh,  | Koi-Kaoi,         | Váká, Vádi,   | Aghén,       |              |
| Above, <i>prep</i> .             | Uporot,              | Psháo,       | Unhoi, | Chung,            | Mho,          | Tésho,       |              |
| Absent, <i>a</i> .               | Gorházér,            | Girri,       |        | Aumín,            | Tomo,         |              |              |
|                                  | Khotiá,              |              |        |                   |               |              |              |
| Abundance, <i>n</i> .            | Horoh,               | Kébang,      | Anúng, | Atím,             | Kia-pézé,     | Kéchang,     | Kéda         |
| Accept, <i>v</i> .               | Loh, Grohon-<br>kor, | Lá,          | Ponon, | Látún,            | ilélé,        | Khilé khé,   | Lúlu         |

|                         |                                    |                        |                     |                       |                          |
|-------------------------|------------------------------------|------------------------|---------------------|-----------------------|--------------------------|
| Accompany, <i>v.</i>    | Logúthang,                         | Langlongtúno,          | Hengchetang,        | Kézátollé,            | Hahigákhé,               |
| Accurate, <i>a.</i>     | Thik,                              | Chingbarchit,          | Kibang,             | Tú,                   | Kégwéto,                 |
| Ache, <i>n.</i>         | Bédéná, Bikh,                      | So-ong,                | Anái,               | Chí, Shí,             | Thébénió,                |
| Acid, <i>a.</i>         | Tengá,                             | Hánthor,               | Thé,                | Króh, Kkhíé,          | Késhang,                 |
| Acquaintance, <i>n.</i> | Sinákí,                            | Nidou,                 | Kéhét-ngái,         | Késimá, Ur-<br>chimá, | Kenthonmé,               |
| Advance, <i>v.</i>      | Ág-ho,                             | Áphráng,               | Mashatun,           | Rále,                 | Régatá,                  |
|                         | Séangjá,                           |                        | Amalumché-<br>tang, |                       |                          |
| Advantage, <i>n.</i>    | Lábh,                              | Aláp,                  | Aláp,               | Méri,                 | Ákurraohé,               |
| Adversary, <i>n.</i>    | Hotrú,                             | Arléng lingo,          | Migló,              | Kéngúma,              | Phinimú,                 |
| Adult, <i>n.</i>        | Déká,                              | Rissomár,              | Thungwál,           | Khisámá,              | Ponniu,                  |
| Adze, <i>n.</i>         | Sins,                              | Sát,                   | Hékhúnga,           | Kethi,                | .....                    |
| Afar, <i>ad.</i>        | Dúroi,                             | Heloving,              | Alá, Gumlapi,       | Shachá,               | Kétháng,                 |
| Affection, <i>n.</i>    | Isto,                              | .....                  | Alúngshie,          | Khré,                 | .....                    |
| Affray, <i>prop.</i>    | Kilá-kili,                         | Chiehok,               | Akidélui,           | Kevo,                 | Kégá,                    |
| After, <i>prop.</i>     | Pásot,                             | Chosálgá,              | Nungsung,           | Sá,                   | Shéki,                   |
| Afternoon, <i>n.</i>    | Abéli, or Bha-                     | Aphí,                  | Nisagéhítai,        | Thékhévá,             | Sungweméso,              |
|                         | Samlíha,                           | Anibéng,               |                     |                       |                          |
| Again, <i>ad.</i>       | Ákáo, or Pu-<br>Arúdáng,<br>norai, | Apár,                  | Húmbolkhir,         | Lá,                   | Hiangwo,                 |
| Age, <i>n.</i>          | Boyoh,                             | Nikúnkun,              | Nésuna,             | Képenotá,             | Chán,                    |
| Aged, <i>a.</i>         | Burá,                              | Sarbúrra,              | Téhsi,              | Kéché,                | Péthiniu,                |
| Ague, <i>n.</i>         | Konp-jor,                          | Sodét Kéch-<br>Akíhot, | úng,                | Kipé,                 | Luvénio or Ru-<br>vénio, |
| Air, <i>n.</i>          | Botáth,                            | Timon,                 | Húi,                | Timelhu,              | Chembé,                  |
| Alike, <i>ad.</i>       | E'ké-likhiá,                       | Chinlidong,            | Múnkhutto-<br>baug, | Kémhá,                | Altháágwén-<br>to,       |
| Alive, <i>a.</i>        | Jiá,                               | Akering,               | Ahing,              | Rhi,                  | Akéhung,                 |
| All, <i>a.</i>          | Átái,                              | Kédoh,                 | Abonin,             | Pété,                 | Atatung,                 |
|                         |                                    |                        |                     |                       | Haimná                   |

| English.                                            | Assamese.                                                                                                             | Kachári.                                              | Mikir.                                                     | Kúki.                                                            | Angámi Nágá.                                           | Rengmá Nágá.                                              | Kutobá Nágá. |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------|--------------|
| Alligator,<br>Almighty,                             | <i>n.</i> Ghoríál,<br><i>a.</i> Hokoloré-hok-<br>ti,                                                                  | Géné,<br>Khoribjong-<br>boldong,                      | Timong,<br>Aiakung thé-<br>ong,                            | Wallé,                                                           | Rá, Khokérrá,<br>Petekiké me-<br>chiashwe,             | Kérrá,<br>Atháké árhé-<br>nia,                            |              |
| Alone,<br>Aloud,<br>Also,<br>Altogether,<br>Always, | <i>a.</i> Okol,<br><i>ad.</i> Borkoi,<br><i>ad.</i> Áró,<br><i>ad.</i> E'ké logé,<br><i>ad.</i> Hodái, Oréo,<br>Nito, | Sáojang,<br>Ráohi,<br>Ar,<br>Gáthaisi,<br>Nállé,      | Inúná,<br>Yasomét,<br>.....<br>Kédokávé,                   | Kutchung,<br>Hapinsétum,<br>.....<br>Númkhát,<br>.....           | Thé, Rébi,<br>Rékré,<br>Ri,<br>Pété-Kézé,<br>Té-sonhá, | Mémé, Empú<br>Unré, Kézong,<br>.....<br>Kechang,<br>..... |              |
| Amid,<br>An, a, one,                                | <i>prep.</i> Maj, majat,<br><i>a.</i> E'tá,                                                                           | Gajér,<br>Sásóí, mási,                                | Angbong,<br>Inunan<br>Inút,                                | Aláilung,<br>Pó, Khat,                                           | Métcho-mi,<br>Pó,                                      | Azogá,<br>Kémmé,                                          | Kát          |
| Ancle,<br>And,<br>Anger,<br>Annually,               | <i>n.</i> Bhorir gánthi,<br><i>conj.</i> Áró,<br><i>n.</i> Khong,<br><i>ad.</i> Bosoré-bosor,                         | Yaauthái,<br>Ar,<br>Thámsi,<br>Maithai-mai-<br>thai,  | Kéhangbi,<br>.....<br>Nimingthip,<br>Aninkan-anin-<br>kan, | Káokhimit,<br>.....<br>Alúngsáahi,<br>Kúmkhút,<br>Kumni,         | Phimbi,<br>Ri,<br>Nimo,<br>Tichiképrá,                 | Phábéro,<br>.....<br>Aionkhé,<br>Achang,                  | Dé           |
| Ant,<br>Ant-hill,                                   | <i>n.</i> Porjá,<br><i>n.</i> Hápholo,                                                                                | Khashima,<br>Horima-há-<br>phlo,                      | Misú,<br>Téplong-ánú-<br>rák,                              | Shingshang,<br>Léwangin,                                         | Mháché,<br>Repá,                                       | Tenta,<br>Unpiong,                                        | Ntiéná       |
| Apiece,<br><br>Armadillo,<br>Armbet,<br>Armpit,     | <i>ad.</i> E'tá-étá,<br><br><i>n.</i> Kántai,<br><i>n.</i> K háró,<br><i>n.</i> Kákhlotá, Bo-<br>gol,                 | Mási-mási,<br><br>Khátutai,<br>Yáoshét,<br>Phám-khor, | Isi-isi,<br><br>Kárpú,<br>Roi,<br>Jing káp,                | Khut-chiang-<br>khut-chiang<br>Sephú,<br>Nathankul,<br>Kájaniui, | Po-po,<br><br>Tépphu,<br>Kétho,<br>Sochú,              | Kémé-kemé,<br><br>Tépphé,<br>Gi,<br>Aniohsong,            | Héppá        |



| English.          | Assamese.                    | Kachári.                                 | Mikir.      | Kúki.        | Angami Nágá.     | Réngmá Nágá.          | Kutobá Nágá. |
|-------------------|------------------------------|------------------------------------------|-------------|--------------|------------------|-----------------------|--------------|
| Bark, (of a tree) | <i>n.</i> Sál,               | Pongúr,                                  | Théngú,     | Thingoh,     | Pokú, Sijha,     | Sháinhél, or Shingél, |              |
| Bark,             | <i>v.</i> Bhúnt,             | Shongmá,                                 | Kánú,       | Ahup,        | Ré-shi,          | Kérúan,               |              |
| Barn,             | <i>n.</i> Bhonráli ghor,     | Mainoh,                                  | Sokporú,    | Changin,     | Telha-ki,        | Tiswán,               |              |
| Barrel, (gun)     | <i>n.</i> Noli,              | Noli,                                    | Allangpong, | Meipumlong,  | Pú,              | Pong,                 |              |
| Barter,           | <i>v.</i> Holó,              | Sakai-jalainú                            | Chilárná,   | Kilhénghété, | Kéllí,           | Kélléché,             |              |
| Basin,            | <i>n.</i> Kanhi,             | Khopurá,                                 | Kású,       | Kúng,        | Mékhú,           | Túkhong,              |              |
| Bastard,          | <i>n.</i> Johorrah,          | Paujik péssá, or Pophá-giri-yába, péssá, | Sorongro,   | .....        | Tékrono,         | Kéohlangnin,          |              |
| Bat,              | <i>n.</i> Bádoli,            | Taupámá,                                 | Wárlák,     | .....        | Ché-chá,         | Sémphong,             | Tellá        |
| Bathe,            | <i>v.</i> Gá-dho, or Snákor, | Digrunang,                               | Chinglúji,  | Késiltum,    | Zuréluché,       | Lahté,                | Dúpiá        |
| Battle,           | <i>n.</i> Ron,               | Chébbá,                                  | Ron,        | Gál,         | Térth,           | Téri,                 | Hérneo       |
| Beak,             | <i>n.</i> Thont,             | Bokho,                                   | Anktúr,     | Amú,         | Ta,              | Méng,                 | Múi          |
| Beam,             | <i>n.</i> Sói,               | Súkúr                                    | Kardong,    | Inkum,       | Ki-pér,          | Kásun,                |              |
| Bear,             | <i>n.</i> Bhálúk,            | Músúbromá                                | Thogwán,    | Vompi,       | Thégá,           | Thágúá,               | Hégúám       |
| Beard,            | <i>n.</i> Dánri,             | Khámphor,                                | Múng,       | Khámul,      | Támá, Mekh-wémá, | Mangha,               | Múmai        |
| Beat,             | <i>v.</i> Kúbáo, Már,        | Sho,                                     | Choknún,    | Votun,       | Vúché,           | Vúché or Vútá,        | Ngáu-ida     |
| Beautiful,        | <i>n.</i> Húndor,            | Naabahami,                               | Méong,      | Véti náphai, | Ngú-kévi,        | Gwáswá,               |              |
| Bedstead,         | <i>n.</i> Húá-khát,          | Thúthani,                                | Ki-iádm,    | Jálkhun,     | Thén,            | Nang, Long,           |              |
| Bedding,          | <i>n.</i> Túli,              | .....                                    | Káchlinápé, | Ponphá,      | Zikha,           | Zikéshéngphé,         | Jéokum       |
| Bee,              | <i>n.</i> Mo,                | Péréká, or Pé-Pio, ré,                   |             | Húivá,       | Mékhwi,          | Lhui,                 | Héliá        |

|             |                                  |                       |                     |             |                      |                      |
|-------------|----------------------------------|-----------------------|---------------------|-------------|----------------------|----------------------|
| Beef,       | <i>n.</i> Gorúrmongoh,           | Méshoháin,            | Cháinongáok,        | Shilhutshá, | Mithúchi,            | Ménthútha,           |
| Before,     | <i>prep.</i> Agot, Hamú-<br>khé, | Sékang,               | Aphráng,            | Mésang,     | Mohzú,               | Hodí,                |
| Beg,        | <i>v.</i> Māng,                  | Sainji,               | Chúhang,            | Thúménétun, | Krohchiléché,        | Jétah, Hélo-<br>tah, |
| Beggar,     | <i>n.</i> Mogoniá,               | Sainjiába,            | Kédúkébang,         | Miváicha,   | Kroh-kéchi-<br>má,   | Hékátániu,           |
| Behind,     | <i>prep.</i> Pisot, Pásot,       | Yáonhúng,             | Aphi,               | Núnglam,    | Sáchá,               | Shégi,               |
| Behold,     | <i>v.</i> Dékh, Sá,              | Nái,                  | Langnún,            | Vétun,      | Pilé,                | Phítá,               |
| Belch,      | <i>v.</i> Hinkotá kor,           | Hanglúngmu-<br>maibé, | Ijoi,               | Kasaie,     | Pékhé,               | Kénja,               |
| Bellow,     | <i>v.</i> Béba,                  | Kérrábá,              | Kángrong,           | Sélabú,     | Moché,               | Kánga,               |
| Belly-ache, | <i>n.</i> Bét-kámor,             | Hohsádú,              | Apöksodet,          | Káowai onái | Vadiché,             | Ghéntha,             |
| Belly,      | <i>n.</i> Pét,                   | Hoh,                  | Apok,               | Káowai,     | Vádi, Vaká,          | Ghén,                |
| Below,      | <i>ad.</i> Tolot,                | Paklá,                | Abér, Arúm,         | Anoi,       | Khó, Khro,           | Téshang,             |
| Belt,       | <i>n.</i> Tongáli,               | Chiahídao,            | Ari,                | Kongkánna,  | Sésá,                | Sangkhuréng,         |
| Bend,       | <i>n.</i> Pák, Mosor,            | Pháikhong,            | Pékéknún,           | Hékontun,   | Kéréguilé,           | Akéngkhúí,           |
| Best,       | <i>a.</i> U'tom,                 | Hamdáo,               | Jérsoméno-<br>chot, | Aphápéntá,  | Kévithóu,            | Athaiángwá-<br>shwá, |
| Better,     | <i>a.</i> Tátkoi bhál,           | Késsá-hám-<br>dáo,    | Jérsoméng,          | .....       | Sésá Kévi,           | Hiangwhá,            |
| Between,    | <i>prep.</i> Majot,              | Kéjar,                | Angbong,            | Alaiúlúng,  | Donú, Metcho-<br>nú, | Káká,                |
| Beware,     | <i>v.</i> Háodhán-ho,            | Táthang,              | Phréremá,           | .....       | Chiswéléché,         | .....                |
| Big,        | <i>a.</i> Dañgor,                | Tébi,                 | Théong,             | Léupiahi,   | Kézá,                | Kégang,              |
| Bill-hook,  | <i>n.</i> Dáu,                   | Shihong,              | Nokpák,             | Chimpong,   | Jé,                  | Jhén,                |
| Bind,       | <i>v.</i> Bandh,                 | Khá,                  | Koknú,              | Kantan,     | Pháilé,              | Phénogotá,           |
| Bird,       | <i>n.</i> Sorái,                 | Táo,                  | Vo,                 | Vachá,      | Pérá,                | Téga,                |
| Birth,      | <i>n.</i> Jonom,                 | Gokhá, Hájai-<br>bá,  | Amangáthé,          | Nacasowé,   | Péno, Képéno,        | Niubénio,            |
|             |                                  |                       |                     |             |                      | Rhinna               |

Po  
Kang

| English.                | Assamese.                     | Kacháři.           | Mikir.       | Kúki.          | Angámi Nágá.    | Réngmá Nágá.           | Kutchá Nágá.  |
|-------------------------|-------------------------------|--------------------|--------------|----------------|-----------------|------------------------|---------------|
| Birth-place, <i>n.</i>  | U'poja-thai, or Jonomo-bhúmi. | Hájaiiba, Hathani, | .....        | .....          | Képénophé,      | Kénuphén,              |               |
| Bitoh, (female of dog.) | Máiki Kúkúr,                  | Sémájúk,           | Mithunapi,   | Winú,          | Phúkrr,         | Téhiphú, or Téhiténin, |               |
| Bite, <i>v.</i>         | Káamor,                       | Wái,               | Kornoi,      | Petún,         | Méki,           | Unkáté or Unkache,     | Nki           |
| Bitter,                 | Títá,                         | Khábi,             | Akého,       | Akhái,         | Kéthú,          | Kéthá,                 | Ketibé        |
| Black,                  | Kóla,                         | Késhim,            | Akéik,       | Avom,          | Kéti,           | Kéché,                 | Michiépe      |
| Blind,                  | Kóná,                         | Kána,              | Amikavé,     | Mitcho,        | Mhichié,        | Hékécháng,             | Hézái         |
| Blood,                  | Téz,                          | Théi,              | Ávi,         | Thi,           | Thézá, [bébá,   | Tézié,                 | Mápá          |
| Blossom,                | Koli,                         | Khém,              | Mir,         | Ámumbim,       | Puniba, or Thé- | Mién,                  |               |
| Blow,                   | Phúñ-dé,                      | Shú,               | Kibút,       | Mútun,         | Mhélé,          | Téshi,                 | Nizai         |
| Blue,                   | Kám boroniá,                  | .....              | .....        | Adumé,         | Loshi,          | .....                  |               |
| Board,                  | Pát,                          | Bongflong,         | Kápat,       | Thingphél,     | Méla, Sobja,    | Shénpáng,              |               |
| Boat,                   | Náo,                          | Rong,              | Tillong,     | Kóung,         | Rú,             | Rúng or Rong,          | Liámkúá       |
| Boatman,                | Náoworiá,                     | Ronggiayábá,       | Tillongkévé, | Kóungiabho,    | Rú kethumá,     | Rúngécho,              | Liam-Ketsaimi |
| Body,                   | Gá,                           | Sáo,               | E'bang,      | Kati,          | Moh,            | Moh or Um-             | Méo           |
| Boil,                   | U'tolái de, or Hjai dé,       | Méthonghá,         | Kárllok,     | Go-omsán,      | Mékirolé,       | mén, Und-wávésbo,      |               |
| Bold,                   | Háhiál, or Nibhoi,            | Bakharobi,         | Phéréré,     | Kékichapúi,    | Kérézá,         | Kémé késsa,            |               |
| Bone,                   | Hár,                          | Párain,            | Répi,        | Shágú,         | Rú,             | Thirra,                | Rá (Pérá)     |
| Book,                   | Púthi,                        | Khitáp,            | Khitáp,      | Lékhá,         | Léshi,          | Láshi,                 | Léshú         |
| Boot,                   | Jútá,                         | Jútá,              | Kengok,      | Kéng-ko,       | Phikú,          | Pházaka,               |               |
| Borrow,                 | Diár-kor,                     | Jalá,              | Ránnun,      | Athunginlátun, | Thépúlé,        | Tépúréta, or Téperéta, |               |



|                  |   |                    |             |                |             |                |                |             |
|------------------|---|--------------------|-------------|----------------|-------------|----------------|----------------|-------------|
| Bottom,          | n | Tol, Guri,         | Pakhlā,     | Abéi,          | Atoku,      | Khro,          | Teshing,       |             |
| Bough,           | n | n Dal,             | Bondé,      | Aio,           | Thengba     | Si Chue, Sicho | Shempha,       | Henai       |
| Boundary,        | n | n Hima,            | Harr,       | Ahoi,          | Gichang     | Thera,         | Teie,          | Helle, Piar |
| Bow,             | n | n Dhenu            | Chili,      | Bath,          | Gophel,     | Ihlla,         | Lobu,          |             |
| Bowls,           | n | n Nari bhunru,     | Pubu,       | Pheg,          | Kaghl,      | Poria,         | Re,            |             |
| Box,             | n | n Pera,            | Sundu,      | Pra            | Then, long  | Kuzo,          | I ua,          |             |
| Boy,             | n | n Lora,            | Aisa,       | U su,          | Chapang,    | Nichuma,       | Unchann,       | Henani      |
| Bracelet,        | n | n Kharu,           | Khadu,      | Roi,           | Chau,       | Yetse,         | Pen,           | Heta        |
| Brass,           | n | n Muror ghun,      | Bthim,      | Atruloh,       | Lhobu,      | Khuu,          | Sha or U'nsa   | Khua        |
| Breadth,         | n | n Pitol,           | Pshle,      | Bitol or Bitoi | Shumeng,    | Mereni,        | Pengi,         | Pitalaigo   |
| Break,           | n | n Pothah,          | Kebeng,     | Arpun,         | Ayavalin    | Ja Poza,       | Ad,            |             |
| Breast,          | n | n Bhang oi Sing    | Sepatha,    | Phlangunon     |             | Beswle,        | Yosego,        |             |
| Breath,          | n | n Hya, Buku,       | Khabo,      | Ning,          |             | Meri,          | Mhong,         | Kaka        |
|                  | n | n U hab,           | Hang,       | Anghoangh      |             | Ha,            | Unte-lu,       |             |
| Breathe,         | n | n U khah lo,       | Honglabu,   | Echethe        | Lei         | Ha shiche,     | Unteshu theti, | Kepum       |
| Bridge,          | n | n Dolong,          | Dolong, lao | Dolong,        |             | Peh,           | Long,          |             |
| Bring,           | n | n An,              | Labu,       | Wanun,         | Houchontan, | Sephui, Pe-    | Sengrota,      | Pepelo      |
| Broad,           | n | n Bohol,           | Ketho,      | Heong,         |             | khoi,          |                |             |
| Broad-cloth,     | n | n Benat kapoi,     | Banoi u,    | Manat apé,     |             | Meja,          | Kezang,        |             |
| Broken, part     | n | n Bhanga or Singa, | Paikha,     | Lokpé,         | Akeatai,    | Bula Khwé,     | Banaphe,       |             |
| Broom,           | n | n Barhoni,         | Naosup,     | Arphek,        | Munthe,     | Vaphioa, Bet   | Akese,         |             |
| Brother (elder), | n | n Kokai,           | Dada,       | Nuh,           | Kaupa,      | 'wewa,         | Kazekha,       | Sosunghe    |
| Brother,         | n | n Bhai,            | Janyang,    | Nimu oi        | Kanaupá,    | Nizwero,       | Sagah,         | Sarebé      |
| (younger)        | n | n Jéthér,          | Adong,      | Nekor,         |             | Zorao,         | Sézhung ahor,  |             |
| Brother-in-law,  | n | n                  | Aghnu,      | Neme,          |             | Sazéo,         | Sezhunge,      |             |
|                  |   |                    |             |                |             | ...            | Amu,           |             |

| English.                                                                                                                                                        | Assamese.                                                                                                                                                                                                     | Kachárá.                                                                                                             | Mikir                                                                                                                  | Kuki                                                                                        | Angam Nágá                                                                                                                          | Réngmá Nágá                                                                                                                 | Kutchá Nágá                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Brow,<br>Buck, (deer)<br>Buffalo,<br>Build,<br>Bull,                                                                                                            | <i>n</i> Kópál,<br><i>n</i> Motá pohú,<br><i>n</i> Moh,<br><i>v</i> Hojá,<br><i>n</i> Har, Bhotorá,                                                                                                           | Thám,<br>Chella,<br>Misép,<br>Tángmá,<br>Mesu-jellá,                                                                 | Téhang,<br>Thokalo,<br>Jilone,<br>Kinnun,<br>Chamongalu,                                                               | Kedapang,<br>Loi,<br>Sátan<br>Bonghul,                                                      | Tikhá,<br>Tekluá-po-shi,<br>Relh,<br>Sleché,<br>Thudo,                                                                              | Samphuh,<br>Te-hangpécha<br>Sanchong,<br>Thélotá,<br>Máuthé,<br>Páché,                                                      | Kési<br>Réllu<br>Télo<br>Ké tumséo<br>Hégebaichu       |
| Bullet,<br>Bundle,<br>Burden,<br>Burn,<br>Burst,<br>Bury,<br>Butterfly,<br>Button,<br>Buy,<br>By-and-by, <i>ad</i> Athoni,<br>Bird cage, <i>n</i> Soráior hojá, | <i>n</i> Goli, Gúli,<br><i>n</i> Topolá,<br><i>n</i> Bhár,<br><i>v</i> Porá, [Phutá<br><i>v</i> Phutái dé,<br><i>v</i> Pót,<br><i>n</i> Pokhlá,<br><i>n</i> Gudám,<br><i>v</i> Kin,<br><i>n</i> Soráior hojá, | Golli,<br>Pakho,<br>Papan,<br>Saoha,<br>Pérekhokla,<br>Phaba,<br>Tamá,<br>Gutám,<br>Parai,<br>Yaokhung,<br>Khangkhá, | Golli or Amu<br>Abor,<br>Bhár,<br>Kanon,<br>Phukdak,<br>Pibnon,<br>Pipling,<br>Gudam,<br>Námnun,<br>Mo-áphi,<br>Vo-un, | Mechang,<br>Ponchun,<br>Ghaltun,<br>Gáphutun,<br>Pengpilep,<br>Shankhokul,<br>Chutan,<br>.. | Mishu-sh<br>Kiri, [álé,<br>Pé, Rewala, Pitu-Rolota,<br>Baphroa, Pto,<br>Khruallé,<br>Sopio,<br>Bull + Kélu,<br>Khu-leché,<br>Yá, .. | Golli,<br>Aduá, ..<br>Shonko,<br>Ása,<br>Gudám,<br>Hulota,<br>Térékhen or<br>Togakhen,<br>Ménthunio,<br>Chen,<br>Kolokottá, | Hégebaichu                                             |
| Calf,<br>Calf- (offleg.)<br>Call,                                                                                                                               | <i>n</i> Dámuri,<br><i>n</i> Kol phul,<br><i>v</i> Mát,                                                                                                                                                       | Mé-opé-sá,<br>Yáichu,<br>Longhá,<br>Churhuikhá,                                                                      | Chanongáso,<br>Sárti,<br>Hangnún,<br>Pri,<br>Bortope,<br>Photu,                                                        | Chilutmi.<br>Katangai,<br>Gakotun,<br>Ting,<br>Lúshu,                                       | Mithúno,<br>Phut-a,<br>Keshu-ché,<br>Thérri,<br>Sidi,<br>(Má lélu, <i>i e</i><br>great gun.)<br>Chuié,                              | Togakhen,<br>Ménthunio,<br>Chen,<br>Kolokottá,                                                                              | Kétumpúina<br>Kúlo<br>aria<br>Hugibé-kedibé<br>Potohom |
| Cane,<br>Canon,<br>Cap,                                                                                                                                         | <i>n</i> Bént,<br><i>n</i> Bor Tóp,<br><i>n</i> Túpi,                                                                                                                                                         | Rai,<br>Kamon,<br>Tópi,                                                                                              | Pri,<br>Bortope,<br>Photu,                                                                                             | Ting,<br>Lúshu,                                                                             | Thérri,<br>Sidi,<br>(Má lélu, <i>i e</i><br>great gun.)<br>Chuié,                                                                   | Togakhen,<br>Ménthunio,<br>Chen,<br>Kolokottá,                                                                              | Kétumpúina<br>Kúlo<br>aria<br>Hugibé-kedibé<br>Potohom |



| English.  | Assamese.                       | Kachári.             | Mikir.        | Kúki.        | Angámi Nágá.            | Réngná Nágá.                                                                                               | Kutchá Nágá. |
|-----------|---------------------------------|----------------------|---------------|--------------|-------------------------|------------------------------------------------------------------------------------------------------------|--------------|
| Conceal,  | <i>v.</i> Lókúá,                | Hoidádén,            | Chipátúnón,   | Gashéltun,   | Kéváléché,              | Kébéléché, or<br>Kébélégot-<br>tá,<br>Vánlogottá,<br>.....<br>Rénganú,<br>Amén,<br>Chopsa, Chot-<br>Téphú, |              |
| Cook,     | <i>v.</i> Hijiú,                | Shong,               | Túnón,        | Hontán,      | Sháléché,               |                                                                                                            |              |
| Copper,   | <i>n.</i> Tán,                  | Tám,                 | Tám,          | Shomshún,    | Páisáji,                |                                                                                                            |              |
| Cord,     | <i>n.</i> Jorí,                 | Wátú,                | Phámmi,       | Kháohú,      | Kérré,                  |                                                                                                            |              |
| Cost,     | <i>n.</i> Dám, Dor,             | Péshén,              | Ador,         | Amún,        | Poná,                   |                                                                                                            |              |
| Cotton,   | <i>n.</i> Kopáh,                | Khún,                | Phélló,       | Patbo,       | Chopsa, Chot-<br>Téphú, |                                                                                                            |              |
| Cover,    | <i>v.</i> Dhák,                 | Tháphúnátun,         | Linnón.       | Khúkhúnatun, | Whé-hiché,              | Shénota,                                                                                                   |              |
| Count,    | <i>v.</i> Lékh, Gononá-<br>kor, | Lékhánun, Sain,      | Lékhánun,     | Shimtémin,   | Phréléché,              | Phúlo-gotá,                                                                                                |              |
| Cow,      | <i>n.</i> Gorú,                 | Meshojo,             | Chainong ápi, | Chilhatun,   | Thukr,                  | Ménthainio,                                                                                                | Kétum púi    |
| Cow-dung, | <i>n.</i> Gabor,                | Méshokhi,            | Cháimongáhi,  | Chilhaté,    | Mithúbo,                | Ménthébbú,                                                                                                 |              |
| Coward,   | <i>n.</i> Bhoiátúr,             | Khéníabásé-<br>bong, | Phénéong,     | Mimédoi,     | Kémithimá,              | Unthúbinio,                                                                                                |              |
| Cowree,   | <i>n.</i> Kori,                 | Kháodi,              | Súbai,        | Lúngchung,   | Késa,                   | Táshí,                                                                                                     |              |
| Crab,     | <i>n.</i> Kénkorá,              | Kháng-Khrái,         | Chéché,       | Ái,          | Ségo,                   | Chégú,                                                                                                     |              |
| Crazy,    | <i>a.</i> Boliá,                | Kébir,               | Angchámú,     | Mingolahi,   | Kéloho, Kén-<br>wémá,   | Kénoinu,                                                                                                   |              |
| Crooked,  | <i>a.</i> Bénká,                | Kokúí,               | Kédáng,       | Akon,        | Kéregwi,                | Khurá,                                                                                                     | Hégá         |
| Crow,     | <i>n.</i> Káuri,                | Dáoklá,              | Voak,         | Vá-ú,        | Shijá,                  | Tégú,                                                                                                      |              |
| Cry,      | <i>v.</i> Kánd,                 | Kérrádé,             | Chirúnot,     | Káptan,      | Králé,                  | Chilota,                                                                                                   |              |
| Cubit,    | <i>n.</i> Hát,                  | Khújálá,             | Echak,        | .....        | Thú,                    | Unká,                                                                                                      |              |
| Cup,      | <i>n.</i> Báí,                  | Phongtbo,            | Harlong,      | Vaulhéng,    | Téllí,                  | Hángpén,                                                                                                   |              |
| Custom,   | <i>n.</i> Dostúr, Niom,         | Tará,                | Aron,         | .....        | U'zié,                  | [gotta,                                                                                                    |              |
| Cut,      | <i>v.</i> Kát,                  | Tain,                | Thúnón,       | .....        | .....                   | Déta or Délo-                                                                                              |              |



| English.    | Assamese.                 | Kacháři.                                                            | Mikir.                                 | Kúki.         | Angámi Nágá.                                         | Réngmá Nágá.                                         | Kutchá Nágá. |
|-------------|---------------------------|---------------------------------------------------------------------|----------------------------------------|---------------|------------------------------------------------------|------------------------------------------------------|--------------|
| Drum,       | <i>n.</i> Dhol,           | Khrám,                                                              | Chéng,                                 | ....          | Kébbá,                                               | Bén,                                                 |              |
| Drunk,      | <i>a.</i> Motoál,         | Pogljájbá,                                                          | Hongangri,                             | Kémézá,       | Injévémon,                                           | .....                                                |              |
| Dry,        | <i>a.</i> Húbán,          | Ráinkhá,                                                            | Kréng,                                 | .....         | Késsá,                                               | Akénkoh,                                             |              |
| Dry,        | <i>a.</i> Húkúá,          | Karrainkhlai,                                                       | Khréngnon,                             | .....         | Só,                                                  | Phologotlá,                                          |              |
| Dung,       | <i>n.</i> Gú,             | Khi,                                                                | Hi,                                    | .....         | Bo,                                                  | Abú,                                                 |              |
| Dysentery,  | <i>n.</i> Khor,           | Hoshábá,                                                            | Képávi,                                | .....         | Thézá-bo,                                            | .....                                                |              |
| Ear,        | <i>n.</i> Kán,            | Khááo,                                                              | E'no,                                  | .....         | Nié,                                                 | Nitun,                                               |              |
| Earring,    | <i>n.</i> Untí,           | Khéři (for Nothengpi male), Khoi-<br>metai (for Keding-<br>female), | E'no, Nori, and<br>Keding-<br>chingro, | .....         | Rénni (for<br>males), Ni-<br>so, (for fe-<br>males), | Umbén (for<br>males), Té-<br>biníé (for<br>females), |              |
| Earth,      | <i>n.</i> Prithibi, Máti, | Há,                                                                 | Longlé,                                | .....         | Kizí,                                                | Kázi,                                                |              |
| Earthquake, | <i>n.</i> Bhúinkopp,      | Panglá,                                                             | Chikáli,                               | .....         | Kiéki,                                               | Chinganié,                                           |              |
| East,       | <i>n.</i> Pú,             | Sáimphnébá,                                                         | Niháng,                                | .....         | Náki-kéthú-<br>chá,                                  | Hékápi,                                              |              |
| Eat,        | <i>v.</i> Khá,            | Chi,                                                                | Choláng,                               | .....         | Dzo,                                                 | Túlogotta,                                           |              |
| Egg,        | <i>n.</i> Koni,           | Dáoti,                                                              | Voti,                                  | .....         | Théthá,                                              | Di,                                                  |              |
| Eight,      | <i>a.</i> Áth,            | Chái,                                                               | Nirkép,                                | Ghít,         | Mékú-pomo-<br>théthá,                                | Tassé,                                               | Héssa        |
| Eighteen,   | <i>n.</i> Othéro,         | Mághichái,                                                          | Khrénérkep,                            | .....         | Libé-théthá,                                         | Kipúntassé,                                          |              |
| Eighty,     | <i>a.</i> Ási,            | Pishábrí,                                                           | Throkirkép,                            | Shomghit,     | Bútú,                                                | Hain-tassé,                                          | Rhé héssá    |
| Elbow,      | <i>n.</i> Kilákúnti,      | Yáoshúkong,                                                         | Eritúngdé,                             | .. ..         | Chú, Tsú,                                            | Khoshé                                               |              |
| Elephant,   | <i>n.</i> Hái, Hantí,     | Méyung,                                                             | Ingnár,                                | .....         | Kerr-o-po,                                           | Piong,                                               | Heppúa       |
| Eleven,     | <i>a.</i> E'gháro,        | Májishe,                                                            | Kré-ási,                               | Shom-le-khat, | Théva,                                               | Sérrah-kame-<br>sha,                                 | Kélé         |
| Evening,    | <i>n.</i> Godhúli,        | Sárriri,                                                            | Ningvéutung,                           | Hojinkon,     | Mhi,                                                 | Néugémésó,                                           |              |
| Eye,        | <i>n.</i> Sokú,           | Mhú,                                                                | Mék,                                   | Mit,          |                                                      | Nghé,                                                |              |

|           |                                       |                       |                      |             |                        |                                  |
|-----------|---------------------------------------|-----------------------|----------------------|-------------|------------------------|----------------------------------|
| Eyebrow,  | <i>n.</i> Sélaúri,                    | Mhúrgú, *             | Mékum,               | Kémithkó,   | .....                  | Nghésan,                         |
| Eye-lash, | <i>n.</i> Bhrúb,                      | Mosráng,              | Méksúm,              | Kémítmúl,   | Mhimá,                 | Nghé-la,                         |
| Eye-lid,  | <i>n.</i> Prikofí,                    | Mhúgúr,               | Mékhom,              | Kémítmél,   | Mhi-né,                | Nghéghi,                         |
| Fall,     | <i>v.</i> Por,                        | .....                 | Kalchikoi,           | Lhútán,     | Krr,                   | Képan,                           |
| False,    | <i>a.</i> Mísá,                       | .....                 | Chubé,               | Mijú,       | Kétichi, Ké-<br>chirr, | Nokúngki,                        |
| Far,      | <i>a.</i> Dúr, Antor,                 | .....                 | Héloving,            | .....       | Shá-chá,               | Kajógi,                          |
| Fat,      | <i>a.</i> Motá, Télyá,                | Debi,                 | Aóktánon,            | Milin,      | Lo,                    | Nthegáchang,                     |
| Father,   | <i>n.</i> Bópái,                      | Pábá,                 | Apo or Po,           | Hépá,       | Pú or Apú,             | Apé,                             |
| Fault,    | <i>n.</i> Dái,                        | Khosúr,               | Népáp,               | Ashushé,    | Gwákémo,               | .....                            |
| Feather,  | <i>n.</i> Pákhi,                      | Dáoprung              | Arving,              | Álhá,       | Má,                    | Tégaba,                          |
| Feeble,   | <i>a.</i> Ásokti,                     | Nir-Bolgiri,          | Áiakonga vé-<br>dép, | Áthampúi,   | Méné,                  | Anénda,                          |
| Feed,     | <i>v.</i> Khúá,                       | Bokojiri,             | Phinon,              | Nésátan,    | Váchi,                 | Totari,                          |
| Female,   | <i>a.</i> Máiki,                      | Mesainjé,             | Api,                 | Núme,       | Pokrr,                 | Tainio,                          |
| Fetch,    | <i>v.</i> An,                         | Labo,                 | Vanun,               | Húnciaitan, | Péphirché,             | Ratá,                            |
| Fever,    | <i>a.</i> Jor,                        | Lémdú,                | Késo,                | Akihat,     | Roki,                  | Rúvion,                          |
| Few,      | <i>a.</i> Tákor, Aloí,                | Káisha,               | Ongédelo,            | Thémchá,    | Isá,                   | Khérhonin                        |
| Fifteen,  | <i>a.</i> Pondhéro,                   | Májrá,                | Knéphongo            | Shomléngá,  | Kerr-o-péngú,          | ontésho,<br>Sér-ra-púng-<br>cha, |
| Fifty,    | <i>a.</i> Ponsás, or Dú-<br>kúri Doh, | Pishágini thú-<br>ji, | Phúngo-Kep,          | Shom-ngá,   | Lhi-péngú,             | Hainpúng,                        |
| Fight,    | <i>v.</i> Ron kor,                    | Shojlai,              | Chichoktamé,         | Kikáptun,   | Kéné Zerrh,            | Kégátá,                          |
| Fill,     | <i>n.</i> Bhorá, Púrkor,              | Rém,                  | Peplingnun,          | Shúngtan,   | Sú-shi,                | Phúshítá,                        |
| Fin,      | <i>n.</i> Másor phánd,                | Phráng,               | Abéng,               | Lén,        | .....                  | Chabasha,                        |
| Find,     | <i>v.</i> Bisár po,                   | Shémáihá,             | Rinún,               | Holtan,     | Ngú-shí,               | Phiphítá,                        |
| Finger,   | <i>n.</i> Angúli,                     | Yáoshi,               | Chimon,              | Kakhújúng,  | Bichino,               | Jóngú,                           |
| Fire,     | <i>n.</i> Júi, [thom,                 | Wai,                  | Mé,                  | Méi,        | Mi,                    | Má,                              |
| First,    | <i>a.</i> Pónor, Pro-                 | Sékang,               | Aphráng,             | .....       | Kéroó                  | Kérrega,                         |
| Fish,     | <i>v.</i> Másdhor,                    | Nárún,                | Oknem-nún,           | Ngá-Mámin,  | Khoté,                 | Sáháténótá,                      |

| English.    | Assamese.                 | Kachári.    | Mikir.     | Kúki.         | Angami Nágá         | RéngmáNágá. | Kutchá Nágá. |
|-------------|---------------------------|-------------|------------|---------------|---------------------|-------------|--------------|
| Fish,       | <i>n.</i> Mās,            | Ná,         | Lángok,    | Ngá,          | Kho,                | Diniú saha, |              |
| Fish-hook,  | <i>n.</i> Borokhi,        | Phishá,     | Arpi,      | Ngá-kui,      | Khoségwá,           | Hekhúú,     |              |
| Fishingrod, | <i>n.</i> Brokhiánri,     | Pishaphéng, | Arhiápúl,  | Apó,          | Khosési,            | Késhibú,    |              |
| Five,       | <i>a.</i> Páns,           | Wá,         | Phúngo,    | Ná,           | Péngú,              | Púng,       | Méng ai      |
| Flat,       | <i>a.</i> Homán,          | Shoniaibi,  | Kéklám.    | Akibáng,      | Mézi,               | Jéjángméné, |              |
| Flint,      | <i>n.</i> Páthor,         | Wáiding,    | Arlong,    | Shúng,        | Jipvorú,            | Cho,        |              |
| Flower,     | <i>n.</i> Phúl,           | Khüem,      | Mir,       | Pácha,        | Mémpú,              | or Nién,    |              |
| Fly,        | <i>v.</i> U' r,           | Pénlang,    | Iniornoi,  | Lengtán,      | Nhapú,              | Giéulotta,  |              |
| Fog,        | <i>n.</i> Kúnoli,         | Kúal,       | Inghún,    | Anéi.         | Proché,             | Khélegesi,  |              |
| Foot,       | <i>n.</i> Bhor,           | Yáká,       | Ekéng,     | Kakéng,       | Kembú,              | Phá,        |              |
| Forefinger, | <i>n.</i> Bámún angúli,   | Yáoshi,     | Múnjong,   | Kakhútchal,   | .....               | Jongú,      |              |
| Forehead,   | <i>n.</i> Kópál,          | Tháin,      | Téhang,    | Kadéapang,    | Tikha,              | Insompú,    |              |
| Forest,     | <i>n.</i> Káthoni,        | Hakra,      | Ingnám,    | Gámang,       | Si, Nhá,            | Tére, héu,  |              |
| Forgive,    | <i>v.</i> Khémákor,       | Dákhlaisi,  | Pédoláng,  | Elúngshianin, | Khásiché,           | Khigotta,   |              |
| Forget,     | <i>v.</i> Pahor,          | Piao,       | Tengnedet, | Háitan,       | Rékra mota-<br>ché, | Shángósha,  |              |
| Formerly,   | <i>ad.</i> Táhani, Púrbé, | Shikánghá,  | Hákoké,    | .....         | Kériaki,            | Nháka,      |              |
| Fort,       | <i>n.</i> Kónth,          | Khórong,    | Korkébui,  | Kúl,          | Kúda,               | .....       |              |
| Fortify,    | <i>v.</i> Kónth-mara,     | Khórongká,  | Korbuinon, | .....         | .....               | .....       |              |
| Forty,      | <i>a.</i> Solis, Dúkuri,  | Pishágni,   | Phili-kép, | Shom-li,      | Lhidá,              | Hainghé,    | Rhédai       |
| Four,       | <i>a.</i> Sári,           | Mábrí,      | Phili,     | Li, Li,       | Dá,                 | Kéjé,       | [ché Médaí   |
| Fourteen,   | <i>a.</i> Choidho,        | Magbri,     | Kréphli,   | Shomléli,     | Kerr-o-dá,          | Sánnépéggé- |              |
| Fowl,       | <i>n.</i> Kúkúrá,         | Daono,      | Vo,        | Áchá,         | Théva,              | Térré,      |              |
| Friend,     | <i>n.</i> Mitá,           | Khaphiong,  | Edonéráp,  | Kájol,        | Áso,                | Kamé,       |              |
| Frog,       | <i>n.</i> Béng,           | Imbrú,      | Chongcho,  | U kéng,       | Gwirmo,             | Sággé,      |              |



| Front-door, <i>n.</i> | .....                  | Nosé-kánté-kra,             | Hongthuang-<br>háp,    | Kot-pi,              | Ki-Khá,     | Kákhen,       |
|-----------------------|------------------------|-----------------------------|------------------------|----------------------|-------------|---------------|
| Fruit,                | <i>n.</i> Gútá,        |                             | Athé,                  | Thingá,              | Shi,        | Térráshá,     |
| Gall-bladder,         | <i>n.</i> Píté,        | Bokrong,                    | .....                  | Ihing,               | Thésieh,    | .....         |
| Ginger,               | <i>n.</i> E'dá,        | Pokhlú,                     | Hánsopi,               | Númé,                | Kévú,       | Gasen,        |
| Girl,                 | <i>n.</i> Soáli,       | Hájing,                     | Arlúao,                | E'pén,               | .....       | Tanienu,      |
| Give,                 | <i>n.</i> Dá,          | Péhi,                       | Pinon,                 | Chétan,              | Chi-shi,    | Lopimú,       |
| Go,                   | <i>n.</i> Já,          | Ri,                         | Dannún,                | Kélohá,              | Totá,       | Gokhé, Gotá,  |
| Goat,                 | <i>n.</i> Ságoli,      | .....                       | Vi or Bi,              | Páthéníunjái,        | Tanen,      | Tani,         |
| God,                  | <i>n.</i> Iswor, Déo,  | Brén,                       | Arnám,                 | Soná,                | Terho-diú,  | Térrogha,     |
| Gold,                 | <i>n.</i> Hón,         | Matái,                      | Sér,                   | Áphái,               | Soná,       | Honúngi,      |
| Good,                 | <i>n.</i> Bhál, Báru,  | Kacháo,                     | Méong,                 | Náchákáng,           | Kévi,       | Gwá,          |
| Goose,                | <i>n.</i> Rájáing,     | Hámbeí,                     | Vopitúnga,             | Hépú,                | Tophá-Kedi, | Tophá Kédági, |
|                       |                        | Daophlando-<br>haiung,      | Thú,                   | Hépi,                | Apúchá,     | Abáng,        |
| Grand-father,         | <i>n.</i> Kóká,        | Ajú,                        | Phi,                   | Kátú,                | Ácháp fú,   | Athi,         |
| Grand-<br>mother,     | <i>n.</i> Búri Ái,     | Abí,                        | Isúpo,                 | Katúnú,              | Azápvú,     | Aninga,       |
| Grandson,             | <i>n.</i> Náti,        | Chathai,                    | Isúpi,                 | Hámpá,               | Nono,       | Aniú-gi,      |
| Grand-<br>daughter,   | <i>n.</i> Náini,       | .....                       | Tipli,                 | Khá,                 | Nokimá,     | Lorú,         |
| Grass,                | <i>n.</i> Ghánh,       | Sham,                       | Phélong,               | Mikivúiná,           | Nhá,        | Sékhú,        |
| Grass-hopper,         | <i>n.</i> Phoring,     | Gúing,                      | Arléng-Kipi-<br>adung, | Alin,                | Tékú,       | Témékeahóng,  |
| Grave,                | <i>n.</i> Moidám,      | Phéthani,                   | Kéthé,                 | .....                | Mokhrú,     | .....         |
|                       |                        |                             | Kemúpi,                | Pezie or Ké-Akeshin, | Kédi, Kézá, | Kégang,       |
| Great,                | <i>n.</i> Bor, Dángor, | Debi,                       | Káchinjok,             | pézié,               | .....       | Ajong pú,     |
| Great-toe,            | <i>n.</i> Búrá angúli, | Gáshima,                    | .....                  | Kérhé,               | Ké-Akeshin, | Akénjhú,      |
| Green,                | <i>n.</i> Hiám boron,  | Kéthráng,                   | Ákévé,                 | Kézi,                | Kézi,       | Kázi,         |
| (colour),             | <i>n.</i> Kéngá,       | Kétháng,                    | Longlé,                | Mácháro,             | .....       | .....         |
| Green (raw)           | <i>n.</i> Máti,        | Há,                         | .....                  | .....                | .....       | .....         |
| Ground,               | <i>n.</i> Nélu,        | Diam, or Ká-<br>rángthoroh, | .....                  | .....                | .....       | .....         |
| Gullet,               | <i>n.</i> Nélu,        | .....                       | .....                  | .....                | .....       | .....         |

| English.                 | Assamese.              | Kachári.                 | Mikir.        | Kúti.        | Angami Nágá.  | Réngma Nágá. | Kutchá Nágá. |
|--------------------------|------------------------|--------------------------|---------------|--------------|---------------|--------------|--------------|
| Gun,                     | n. Hiloi,              | Hiloi,                   | Hilé,         | Mépóm,       | Missi,        | Másápúng,    |              |
| Gun-powder,              | n. Khár, [ro, Pakhár,  | [ro, Pakhár,             | Phélo,        | Mélú,        | Bákhar,       | Khorri,      |              |
| Guts,                    | n. Nari, or Bhun-Púbú, | Púbú,                    | Hérré,        | .....        | Riéh,         | Tégwangácha, |              |
| Hail,                    | n. Hil,                | Kédithai,                | Iohú,         | Gil,         | Prr,          | .....        |              |
| Hair (of man),           | n. Súli,               | Khnei,                   | .....         | Shám,        | Tsú-thá, Thá, | .....        |              |
| Hair (of ani-Nom, mals), | n. Pékumi,             | Pékumi,                  | Angmi,        | Ámúl,        | Má,           | .....        |              |
| Half,                    | n. Adhá, E'do-khor,    | E'do-Kéjar,              | Abéng,        | Akéhat,      | Téchá,        | .....        |              |
| Half way,                | n. Adhá bét,           | Lámá kéjar,              | Ajítám,       | Akimjáncá,   | Chákhwipo,    | .....        |              |
| Hammer,                  | n. Hántúri,            | Daukabú,                 | Kibú,         | .....        | Rékri,        | Kéchásén,    |              |
| Hand,                    | n. Hát,                | [dor, Yáofá,             | Néri,         | Kékhút,      | Bi, or Bhi,   | Bén,         |              |
| Handsome,                | n. Húwoni, Sun-        | Mechangbi,               | Méssén or Mé- | .....        | Ngú-vi,       | Kágwá,       |              |
| Hawk,                    | n. Hén,                | Dáolinghá-khri,          | Vomú,         | .....        | Múvino,       | .....        |              |
| He,                      | pro. Hí,               | Bo or Po,                | Báng,         | Hipá,        | Po,           | Higá,        |              |
| Head,                    | n. Múr,                | Khro,                    | Niphú,        | Kalúcháng,   | Tsú,          | Api,         |              |
| Headache,                | n. Múror bikh,         | Khro sháda,              | Niphusodé,    | .....        | .....         | .....        |              |
| Heard,                   | v. Hún,                | Kháns,                   | Arjúnón,      | Ngaitan,     | Rénisé,       | .....        |              |
| Heart,                   | n. Koládil,            | Laikhúnthái, or Khemsob, | Avibong,      | Kalúngchang, | Mélú,         | Akisá,       |              |
| Heavy,                   | n. Godhúr, Bháir,      | Rishibi,                 | Ardigúng,     | Agriá-shi,   | Meswi,        | Nsúri,       |              |
| Heel,                    | n. Géroá,              | Yáshincho,               | Kéngti,       | Kakhú-tárum  | Phitso,       | Pháija,      |              |
| Heir,                    | n. Wáris, Poráí,       | Hajirjáthá,              | Paténg,       | .....        | .....         | .....        |              |
| Help,                    | v. Upokar kor,         | Khanáriha,               | Hangdamún,    | .....        | .....         | .....        |              |
| Hen,                     | n. Máiki kúkúra,       | Déomá,                   | Voápi,        | Á-ánung,     | Vokri,        | .....        |              |

|  | <i>ad.</i> Iyát,<br>v. Lúkrá,<br>n. Diapoliká,<br>n. Toplá,<br>n. Kúr, Kodál,<br>n. Gáhorí,<br>v. Dhor,<br>n. Mójúl,<br>n. Khúná,<br>n. Hing,<br>n. Ghoná,<br>a. Topot, Gorom,<br>n. Ghor,<br>n. Kénékoi,<br><i>ad.</i> Kénán,<br>How much? <i>ad.</i> Káté,<br>How many? <i>ad.</i> Háú,<br>Hundred, <i>a.</i> Bhúk,<br>Hunger, <i>n.</i> Moí,<br>L.<br>Idiot, <i>n.</i> Págol,<br>Idle, <i>a.</i> Eléhúá,<br>Iron, <i>n.</i> Ló,<br>Ivory, <i>n.</i> Hánti dánt, <th><i>E-ráthá,</i><br/>Thém,<br/>Háje,<br/>Chéngkhóng,<br/>Kkhóla,<br/>Kkhudi,<br/>Rém,<br/>Pérdi,<br/>Yáohgúr,<br/>Pókróng,<br/>Korai,<br/>Dóngbi,<br/>Noh,<br/>Pédilai,<br/>Bichlai,<br/>Mábishi,<br/>Rájáshi,<br/>Hokhríbi,<br/>Áng,<br/>Kébir,<br/>Shlébi,<br/>Shér,<br/>Méiung-ha-<br/>thai,<br/>Méshrong,<th>Ládák,<br/>Tonnún,<br/>Inglong,<br/>Vám,<br/>Kú,<br/>Phakáo,<br/>Népnún,<br/>Aláng,<br/>Akéngchémi,<br/>Anú,<br/>Lúisá,<br/>Károm,<br/>Hém,<br/>Kolopúson,<br/>Kolóán,<br/>Koán,<br/>Phérró,<br/>Kángchír,<br/>Né,<br/>Inchám,<br/>Kásélet,<br/>Unchin,<br/>Ingúnásó,<br/>Hijai or Jót-<br/>sat,<br/>Kéchéng,<br/>Inthúnón,<br/>Choupignún,<br/>Vohur,<th>Hákí,<br/>Kéválé,<br/>Kizikhrú,<br/>Luicé,<br/>Kéjá,<br/>Voktr,<br/>Téléché,<br/>Mekhwitza,<br/>Mú,<br/>Ká,<br/>Kwitr,<br/>Lé,<br/>Kí,<br/>Kídi,<br/>Kéziki,<br/>Kichúró,<br/>Krá,<br/>Mérr,<br/>A,<br/>Kéleho,<br/>Meehi,<br/>Thégé,<br/>Chúhu,<th>Héká,<br/>.....<br/>Ringcho,<br/>.....<br/>Khódróng,<br/>l'ébopécha,<br/>Ténglogotta,<br/>Khaði,<br/>.....<br/>Kérrú,<br/>.....<br/>Ká,<br/>.....<br/>Ché,<br/>Gingéndé,<br/>Alé,<br/>Kénanin,<br/>Bingogeteníú,<br/>Tagi,<br/>.....<br/>.....<br/>Shophá,<br/>.....<br/>Génpho,<th>Aká<br/>Daichú<br/>Kihégá<br/>Hai<br/>I<br/>Héjéo</th></th></th></th></th> | <i>E-ráthá,</i><br>Thém,<br>Háje,<br>Chéngkhóng,<br>Kkhóla,<br>Kkhudi,<br>Rém,<br>Pérdi,<br>Yáohgúr,<br>Pókróng,<br>Korai,<br>Dóngbi,<br>Noh,<br>Pédilai,<br>Bichlai,<br>Mábishi,<br>Rájáshi,<br>Hokhríbi,<br>Áng,<br>Kébir,<br>Shlébi,<br>Shér,<br>Méiung-ha-<br>thai,<br>Méshrong, <th>Ládák,<br/>Tonnún,<br/>Inglong,<br/>Vám,<br/>Kú,<br/>Phakáo,<br/>Népnún,<br/>Aláng,<br/>Akéngchémi,<br/>Anú,<br/>Lúisá,<br/>Károm,<br/>Hém,<br/>Kolopúson,<br/>Kolóán,<br/>Koán,<br/>Phérró,<br/>Kángchír,<br/>Né,<br/>Inchám,<br/>Kásélet,<br/>Unchin,<br/>Ingúnásó,<br/>Hijai or Jót-<br/>sat,<br/>Kéchéng,<br/>Inthúnón,<br/>Choupignún,<br/>Vohur,<th>Hákí,<br/>Kéválé,<br/>Kizikhrú,<br/>Luicé,<br/>Kéjá,<br/>Voktr,<br/>Téléché,<br/>Mekhwitza,<br/>Mú,<br/>Ká,<br/>Kwitr,<br/>Lé,<br/>Kí,<br/>Kídi,<br/>Kéziki,<br/>Kichúró,<br/>Krá,<br/>Mérr,<br/>A,<br/>Kéleho,<br/>Meehi,<br/>Thégé,<br/>Chúhu,<th>Héká,<br/>.....<br/>Ringcho,<br/>.....<br/>Khódróng,<br/>l'ébopécha,<br/>Ténglogotta,<br/>Khaði,<br/>.....<br/>Kérrú,<br/>.....<br/>Ká,<br/>.....<br/>Ché,<br/>Gingéndé,<br/>Alé,<br/>Kénanin,<br/>Bingogeteníú,<br/>Tagi,<br/>.....<br/>.....<br/>Shophá,<br/>.....<br/>Génpho,<th>Aká<br/>Daichú<br/>Kihégá<br/>Hai<br/>I<br/>Héjéo</th></th></th></th> | Ládák,<br>Tonnún,<br>Inglong,<br>Vám,<br>Kú,<br>Phakáo,<br>Népnún,<br>Aláng,<br>Akéngchémi,<br>Anú,<br>Lúisá,<br>Károm,<br>Hém,<br>Kolopúson,<br>Kolóán,<br>Koán,<br>Phérró,<br>Kángchír,<br>Né,<br>Inchám,<br>Kásélet,<br>Unchin,<br>Ingúnásó,<br>Hijai or Jót-<br>sat,<br>Kéchéng,<br>Inthúnón,<br>Choupignún,<br>Vohur, <th>Hákí,<br/>Kéválé,<br/>Kizikhrú,<br/>Luicé,<br/>Kéjá,<br/>Voktr,<br/>Téléché,<br/>Mekhwitza,<br/>Mú,<br/>Ká,<br/>Kwitr,<br/>Lé,<br/>Kí,<br/>Kídi,<br/>Kéziki,<br/>Kichúró,<br/>Krá,<br/>Mérr,<br/>A,<br/>Kéleho,<br/>Meehi,<br/>Thégé,<br/>Chúhu,<th>Héká,<br/>.....<br/>Ringcho,<br/>.....<br/>Khódróng,<br/>l'ébopécha,<br/>Ténglogotta,<br/>Khaði,<br/>.....<br/>Kérrú,<br/>.....<br/>Ká,<br/>.....<br/>Ché,<br/>Gingéndé,<br/>Alé,<br/>Kénanin,<br/>Bingogeteníú,<br/>Tagi,<br/>.....<br/>.....<br/>Shophá,<br/>.....<br/>Génpho,<th>Aká<br/>Daichú<br/>Kihégá<br/>Hai<br/>I<br/>Héjéo</th></th></th> | Hákí,<br>Kéválé,<br>Kizikhrú,<br>Luicé,<br>Kéjá,<br>Voktr,<br>Téléché,<br>Mekhwitza,<br>Mú,<br>Ká,<br>Kwitr,<br>Lé,<br>Kí,<br>Kídi,<br>Kéziki,<br>Kichúró,<br>Krá,<br>Mérr,<br>A,<br>Kéleho,<br>Meehi,<br>Thégé,<br>Chúhu, <th>Héká,<br/>.....<br/>Ringcho,<br/>.....<br/>Khódróng,<br/>l'ébopécha,<br/>Ténglogotta,<br/>Khaði,<br/>.....<br/>Kérrú,<br/>.....<br/>Ká,<br/>.....<br/>Ché,<br/>Gingéndé,<br/>Alé,<br/>Kénanin,<br/>Bingogeteníú,<br/>Tagi,<br/>.....<br/>.....<br/>Shophá,<br/>.....<br/>Génpho,<th>Aká<br/>Daichú<br/>Kihégá<br/>Hai<br/>I<br/>Héjéo</th></th> | Héká,<br>.....<br>Ringcho,<br>.....<br>Khódróng,<br>l'ébopécha,<br>Ténglogotta,<br>Khaði,<br>.....<br>Kérrú,<br>.....<br>Ká,<br>.....<br>Ché,<br>Gingéndé,<br>Alé,<br>Kénanin,<br>Bingogeteníú,<br>Tagi,<br>.....<br>.....<br>Shophá,<br>.....<br>Génpho, <th>Aká<br/>Daichú<br/>Kihégá<br/>Hai<br/>I<br/>Héjéo</th> | Aká<br>Daichú<br>Kihégá<br>Hai<br>I<br>Héjéo |
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| English.                   | Assamese.                                    | Kachári.                       | Mikir.                           | Kúki.                           | Angámi Nágá. Réngmá Nágá.                  | Kutchá Nágá.                    |
|----------------------------|----------------------------------------------|--------------------------------|----------------------------------|---------------------------------|--------------------------------------------|---------------------------------|
| Jungle,<br>Keep,<br>Kiekt, | n. Jongol, Hábi,<br>v. Rakh,<br>v. Lethimár, | Hágrá,<br>Mtháo,<br>Jiuphá,    | Ingnám,<br>Pédonang,<br>Túrphit, | Gamlá,<br>Néngatan,<br>Chúntan, | Nhá,<br>Pévéléché,<br>Phitchá-pot-<br>ché, | .....<br>Khénottá,<br>Nashishá, |
| Kid,                       | n. Segolir Poáli,                            | Brinsha, [thái,<br>Tháráp, Mi- | Béaso,<br>Hámhi,                 | Kélnóu,                         | .....                                      | .....                           |
| Kidney,                    | n. Ghilá,                                    | Shúthai,                       | Pithinún,                        | That-tan,                       | Mécha,                                     | .....                           |
| Kill,                      | v. Mar, Bodhkor,                             | Rigú,                          | Pini,                            | Ni,                             | Dukhriléché,                               | .....                           |
| Kilt,                      | n. Mékhlá,                                   | Káshao,                        | Kanghou,                         | Alúnáshi,                       | Ni,                                        | .....                           |
| Kind,                      | n. Morom,                                    | Rája,                          | Récho,                           | Háoshá,                         | Mezié,                                     | .....                           |
| King,                      | n. Rojá,                                     | Yashgú,                        | Kéngphú,                         | Kakhúbú,                        | Kédímá,                                    | .....                           |
| Knee,                      | n. Ánthú,                                    | Khát-ho,                       | Kéthiá, [ká,                     | Kákhúboh,                       | Khútzá,                                    | .....                           |
| Knot,                      | n. Gánthi,                                   | Yáoyén,                        | Rechimúnási-                     | Kakhútchéng,                    | Pélé,                                      | Cho,<br>Abél,                   |
| Knauckle,                  | n. Anguirgánthi,                             | Yaokhléng, or                  | Don-don,                         | Léi,                            | Bikhr,                                     | Jonghú,<br>Shongphá,            |
| Ladder,                    | n. Jokhla,                                   | Yathomai,                      |                                  |                                 | Khéa,                                      |                                 |
| Lame,                      | n. Khorá,                                    | Khorrá,                        | Kátékok,                         | Kéngbai,                        | Réhié,                                     | Nphágwágé-<br>mú,               |
| Language,                  | n. Mát, Bháká,<br>or Dúan,                   | Kérokthábá,                    | Lámkáchéásák,                    | Kapáo,                          | Khvé,                                      | .....                           |
| Leaf,                      | n. Pat,                                      | Plái,                          | Arvo,                            | Ná,                             | Nié,                                       | Jongni,<br>Agi,                 |
| Leather,                   | n. Sál, Samorá,                              | Bokúr,                         | Arreng,                          | Sáwún,                          | Chiza,                                     | Phá,                            |
| Leg,                       | n. T-héng,                                   | Yágá,                          | Kéng,                            | Kékéng,                         | Phi,                                       | Tháshúshá,                      |
| Lemon,                     | n. Némú-téngá,                               | Tháisháyán-<br>shúgar,         | Théso                            | .....                           | .....                                      |                                 |
| Length.                    | n. Dighol,                                   | Káláo,                         | Ajon,                            | Adúng,                          | Kéché,                                     | Athang,                         |
| Leopard,                   | n. Náhor-phútá-<br>ká Bág,                   | Míshathire,                    | Kéthoi,                          | Ajé,                            | Tékhú-khútá,                               | Mamo,<br>Kaoti                  |

|                |                         |             |               |             |              |               |        |
|----------------|-------------------------|-------------|---------------|-------------|--------------|---------------|--------|
| Liek,          | <i>v.</i> Sélérá,       | Spláo,      | Kangléknún,   | Aléetan,    | Méieché,     | Juta,         |        |
| Lightning,     | <i>n.</i> Bijúli,       | Shráp,      | Chétúrkéang,  | Ké,         | Ngúkhwe,     | .....         |        |
| Lip,           | <i>n.</i> Onth,         | Khújar,     | Túr,          | Kánél,      | Sho,         | Méngsi,       |        |
| Listen,        | <i>v.</i> Hún,          | Khánáolá,   | Arjunon,      | Ngáitan,    | Zú,          | .....         | Choi   |
| Little,        | <i>a.</i> Horá, Olop,   | Khásébi,    | Kébi,         | Anéo,       | Blehonon-ré  | Késhén,       |        |
| Little-finger, | <i>n.</i> Kényá angúli, | Yaoshisha,  | Múnso,        | .....       | khrocho,     | Jongúantén-   |        |
|                |                         |             |               |             | Seh,         | ga,           |        |
| Liver,         | <i>n.</i> Agmongoh,     | Páká,       | .....         | Asháo,      | .....        | ... [nin,     |        |
| Long,          | <i>a.</i> Dighol,       | Khaláo,     | Keding,       | .....       | Phiéh,       | Kotojoninabé- |        |
| Luogs,         | <i>n.</i> Háog-phao or  | Poshroh,    | .....         |             |              | .....         |        |
| Man,           | <i>n.</i> Mánúh,        | Pú-Shibúng, | Arléng,       | Mihim,      | Thépyomá, or | Tané or Pe-   | Umpémi |
|                | <i>n.</i> Ukhá-ghor,    |             |               |             | Themmá,      | choniu,       |        |
| Mangoe         | <i>n.</i> Am,           | Thaijú,     | Thárvé-athé,  | Háithé,     | Merrosi,     | .....         |        |
| (fruit),       |                         |             |               |             |              |               |        |
| Meat,          | <i>n.</i> Mongoh,       | Mokong,     | Ok,           | Sá,         | Themnio,     | Tha,          |        |
| Medicine,      | <i>n.</i> Dorob, Darú,  | Múli,       | Bábámúng,     | Lou,        | .....        | Méi,          |        |
| Mend,          | <i>v.</i> Botá,         | Shúkbá,     | Kanghon,      |             | Phréléché,   | Raté,         |        |
| Middle,        | <i>n.</i> Máj,          | Kéjar,      | Angbong,      | Akinjang,   | Métso,       | Alénnin,      |        |
| Midnight,      | <i>n.</i> Houmájjh,     | Hokéjar,    | Yérlo,        | Jankhang,   | Tilloki,     | Hópénso,      |        |
| Milk,          | <i>n.</i> Gakhr,        | Abúdi,      | Amokláng,     | Slatnoitun, | Núdzú,       | Niéde,        |        |
| Monkey,        | <i>n.</i> Pandor,       | Mákhúsa,    | Thévo,        | Jong,       | Tékwi,       | Thékú, Tégú,  | Jémbé  |
| Month,         | <i>n.</i> Mán,          | Tain,       | Chiklo,       | Lhá,        | Khr,         | Sharmé,       |        |
| Moon,          | <i>n.</i> J'un,         | Tain,       | Chiklo,       | or Lhá,     | Krr or Khr,  | Chákáogong,   | Héké   |
|                |                         |             | Chiklolongpi, |             |              |               |        |
| Mosquitoes,    | <i>n.</i> Moh,          | Thamphi,    | Chibún,       | .....       | Virú,        | Tékhú,        |        |
| Mother,        | <i>n.</i> Ai, Mátri,    | Mámá,       | Pé,           | Anú, Hénú,  | Azo,         | Azo,          | Apui   |
| Mountain,      | <i>n.</i> Porbot,       | Hajiu,      | Inglong,      | Molehang,   | Kij-Khrú or  | Réncho,       |        |
|                |                         |             |               |             | Sáje-Khrú,   |               |        |
| Mound,         | <i>n.</i> Háphlú,       | Háphlo,     | Téplong,      | Lhimlúng,   | Répú,        | Umpiong,      |        |
| Moose,         | <i>n.</i> Nigoni,       | Mécho,      | Gokingsho,    | Júchá,      | Zúché,       | Tépu,         |        |
| Mouth,         | <i>n.</i> Mukh,         | Kho,        | Ho,           | Kámú,       | Tá,          | Mangkhong,    |        |

| English.       | Assamese.               | Kachári.        | Mikir.        | Kúki.              | Angami Nágá.        | Róngmá Nágá.         | Kutuhá Nágá.      |
|----------------|-------------------------|-----------------|---------------|--------------------|---------------------|----------------------|-------------------|
| Mud,           | <i>n.</i> Boká,         | Hádebu,         | Inghán,       | Abang,             | Kia,                | .....                | Ké                |
| Musket,        | <i>n.</i> Hiloi,        | Hiloi,          | Hilé,         | Mépum,             | Missi,              | Másáping,            |                   |
| Monstaches,    | <i>n.</i> Gonph,        | Khámphor,       | Ingnum,       | Khámúl,            | Támé,               | Ménghá,              |                   |
| Nail (finger), | <i>n.</i> Nokh,         | Shéráhu,        | Asésélt,      | Tin,               | Bitsé,              | Dáchén,              |                   |
| Naked,         | <i>n.</i> Nángtá,       | Lángthá,        | Aréngangsi,   | Akongmái,          | Métho,              | Niákéno,             |                   |
| Navel,         | <i>n.</i> Nai,          | Hotnai,         | .....         | ... [kom,          | Loh,                | .....                |                   |
| Near,          | <i>prop.</i> Osorot,    | Sámphábi,       | Tébokehét,    | Náichá,            | Ké-Képénoki,        | Núnan,               |                   |
| Neck,          | <i>n.</i> Dingi,        | Koto,           | Chithok,      | Kangong-<br>chang, | Vo or Voo,          | Ghúndá,              |                   |
| Needle,        | <i>n.</i> Béji,         | Shimi,          | Ingprim,      | Héú,               | Thépré,             | Pén,                 |                   |
| Nephew,        | <i>n.</i> Bhatjá,       | Lúra,           | Nékoraso,     | .....              | No or Sazeono,      | Aséjanganu,          |                   |
| Neat, (bird),  | <i>n.</i> Báth,         | Páthib,         | Atár,         | Abú,               | Pérrá-krú,          | Aché,                |                   |
| Net,           | <i>n.</i> Jál, Phánd,   | Ché,            | Lán,          | Lén,               | Zú,                 | Jhó,                 |                   |
| New,           | <i>n.</i> Nótún,        | Katáin,         | Kémi,         | Athá,              | Késsá,              | Késhé,               |                   |
| Niece,         | <i>n.</i> Bháginí,      | Bishá,          | Koráso,       | .....              | Mé,                 | Asénganu,            |                   |
| Night,         | <i>n.</i> Rati,         | Hor,            | Ajio,         | Ján,               | Tizi,               | Chéngarzén,          |                   |
| Nine,          | <i>n.</i> Náú,          | Shiko,          | Sirkép,       | Kó,                | Thékú,              | Takká,               | Tingmúi<br>Hékowi |
| Nineteen,      | <i>n.</i> Unois,        | Majishigú,      | Krésirkép,    | Shom-lé-kó,        | Mekúpomo-<br>thékú, | Kemmélo-<br>shiánki, |                   |
| Ninety,        | <i>n.</i> Nowoi, Noboi, | Bishá brithogi, | Throk sirkép, | Shom-kó,           | Lhi-thekú,          | Hain-takká,          | Rhé-hékowi        |
| No,            | <i>ad.</i> Náí, Nohoi,  | Niá,            | Káli,         | Aompoi,            | Mó,                 | Múlé,                | La                |
| Nose,          | <i>n.</i> Nák,          | Pokung,         | Nokán,        | Nákui, •           | Nhitehá,            | Hikong,              | Chú               |
| Now,           | <i>ad.</i> Etaya,       | Dúha,           | Non,          | Tún,               | Ché-Tsé,            | Ncho,                |                   |
| Oil,           | <i>n.</i> Té,           | Tháo,           | Yángthú,      | Shatháo,           | Gakridú,            | Iéchéudi,            |                   |
| Old,           | <i>n.</i> Búrá, Púroni, | Káráshá,        | Kéasor,       | Téshé, Alú,        | Kétsá,              | Késhén,              |                   |
| Once,          | <i>ad.</i> Ebeli, Ebár, | Alángshi,       | Ipúr,         | Khiátvé,           | .....               | Gwéngwo,             |                   |
| One,           | <i>n.</i> Ek, Etá,      | Mási,           | Lai,          | Khat,              | Po,                 | Kammé,               |                   |

|             |                   |            |              |                          |                      |
|-------------|-------------------|------------|--------------|--------------------------|----------------------|
| Onion,      | n. Piáz, [téungá, | Arsún,     | Lothútil,    | Khová,                   | Shongin,             |
| Orange,     | n. Húnthirá-      | Honthirá,  | Shamátalá,   | Chiffo,                  | Honthirá,            |
| Orphan,     | n. Máurá,         | Yánggré,   | ..... [lip,  | Méronomá,                | Teghoniú,            |
| Owl,        | n. Phéusá,        | Voinghú,   | Chimbúcháng- | Rékthro,                 | Khéusán,             |
| Pain,       | n. Bikh,          | Késo,      | Anáí,        | Chi,                     | Rivénion,            |
| Peacock,    | n. Móiré,         | Vóram,     | To-oiá,      | Rádi,                    | Gédá,                |
| Pig,        | n. Gáhúri,        | Phák,      | Vo-áchá,     | Thévo-(Wild pig, Méngi), | Tébo-(Wild pig, Ni.) |
| Pigeon,     | n. Páro,          | Vothúng,   | Vapár,       | Topér,                   | Topri,               |
| Plantain    | n. Kol-gos,       | Phéngua-   | Náchang,     | Tekwé-Si,                | Tháiabén,            |
| (Tree),     | n.                | pháng,     |              |                          |                      |
| Poison,     | n. Bih,           | Bi,        | Thalgrú,     | Théri,                   | Méi,                 |
| Poor,       | n. Dúkhíá,        | Kédúk,     | Vaichá,      | Mhéji,                   | Téghoinin,           |
| Porcupine,  | n. Kofla-pohú,    | Yohítong,  | Sákú,        | Sékrú,                   | Unchong.             |
| Potato,     | n. Alú,           | Phérúathé, | Há,          | Réphé,                   | Kénrhashá,           |
| Pull,       | v. Tân,           | Vongnong,  | Loitan,      | Téshile,                 | Shilogottá,          |
| Puah,       | v. Théidé,        | Doinún,    | Shontau,     | Néshi,                   | Jhenta,              |
| Raft,       | n. Már,           | Phán,      | Póm,         | .....                    | Pien,                |
| Rafter,     | n. Rúá,           | Rúngmár,   | Vákhai,      | Kárhong,                 | Chinaurha,           |
| Rain,       | n. Borokhún,      | Phérai,    | Go,          | Tir,                     | Tépú,                |
| Rat,        | n. Endúr,         | Hádi,      | Júnám,       | Thézú,                   | Tegi,                |
| Raw,        | n. Kéusá,         | Moshi,     | A'ing,       | Kérhi,                   | Kéiáng,              |
| Bed,        | n. Rongá, Láí,    | Kéthang,   | Ásán,        | Keméri,                  | Chongtá,             |
| Rest,       | v. Jirá,          | Kajáo,     | Ságnún,      | Rélté,                   | Vochinirottá,        |
| Return,     | v. Ubhotí áh,     | Léngboba,  | Kingítan,    | Láklé,                   | Kwénda,              |
| Rhinoceros, | n. Gogur,         | Ságnún,    | Honkitan,    | Kwéda,                   |                      |
| Rib,        | n. Kámi-har,      | Chivoínún, | Gondá,       | Tié,                     | Túp,                 |
| Rice        | n. Bhát,          | Kindú,     | Bú,          | Té,                      |                      |
| (cooked),   |                   | An,        | .....        |                          |                      |
| Rice (un-   | n. Sál,           | Sáng,      | Chángchang,  | Chiko,                   | Cheko,               |
| cooked),    | n.                |            |              |                          |                      |

Habbók-(wild-pig, U'nkia)

Tenghúan

Kwénda

| English.   | Assamese.         | Kacháři.               | Mikir.         | Kúki.         | Angámi Nágá.         | Réngmá Nágá. | Kutchá Nágá. |
|------------|-------------------|------------------------|----------------|---------------|----------------------|--------------|--------------|
| Rich,      | a. Sohoki, Dhoni, | Kanáng,                | Kiri, Keplang, | Aháwá,        | Méhi,                | Kegwanu,     |              |
| Ring,      | a. Angóthi,       | Yáosám,                | Arnán,         | Khotém,       | Kékha,               | Bepkhi,      |              |
| Ripe,      | a. Poká,          | Kémén,                 | Kémén,         | Amintai,      | Mé                   | Kémén,       |              |
| River,     | a. Nól, Nodi,     | Dikhong,               | Langroipi,     | Vádung,       | Kér,                 | Dikéong,     |              |
| Road,      | a. Bát, Ali,      | Lámá,                  | Továr,         | Lampi,        | Chá or Shá,          | Cháng,       |              |
| Root,      | a. Hipá, Gúri,    | Pophang,               | Aukúr,         | Thingbal,     | Mi,                  | Rongmá,      |              |
| Rope,      | a. Jori,          | Dúshá,                 | Ari,           | Kháa,         | Kerré,               | Rong,        |              |
| Rotten,    | a. Posá, Gélá,    | Sháokhá,               | Thúok,         | Amon,         | Títta,               | Réngosho,    |              |
| Rupee,     | a. Toká, Rúp,     | Ráng,                  | Rúp,           | Shúunchéng,   | Ráká,                | Tébipong,    |              |
| Salt,      | a. Lón,           | Shém,                  | Intí,          | Chi,          | Métsá,               | Ché,         |              |
| Same,      | a. Éké,           | Ebúno,                 | Chingbarchit,  | Gotkhat,      | Kémhá,               | Kégwénto,    |              |
| Sand,      | a. Báli,          | Háchén,                | Sangti,        | Pilnél,       | Hochá,               | Hácháng,     |              |
| Sep,       | a. Roh,           | Didongwá,              | Théngpéan,     | Anai,         | Sidzú,               | Shinkong-    |              |
| Save,      | e. Udháktor,      | Máthángbá,             | Jokflotonone-  | .....         | Pévélé,              | niudi,       |              |
| Say,       | e. Koh, Bol,      | Thi,                   | Púnong,        | Sáitan,       | Púlé,                | Théwékhí-    |              |
| Scratch,   | e. Ansórá         | Púrúpá,                | Káchéphú,      | Khot-tan,     | Pekhwásiché,         | losho,       |              |
| See,       | e. Sá, Dékh,      | Nái,                   | Lángnún,       | Vétan,        | Pisiché,             | Nkhmé,       |              |
| Seize,     | e. Dhor,          | Rém,                   | Népúnún,       | Mámin,        | Téléché,             | Phita,       |              |
| Seven,     | a. Hát,           | Máshni,                | Throksi,       | Sági,         | Théná,               | Ténotá,      |              |
| Seventy,   | a. Hotor,         | Pishákéchám-<br>thúji, | Throksi-kép,   | Shom-sági,    | Lhi théná,           | Séni,        | Héná         |
| Seventeen, | a. Hotéro,        | Thojishá,              | Kréthroksi,    | Shom-lé sági, | Mekú-pomo-<br>théná, | Hain-sini,   | Rhé-hená     |
| Shade,     | a. Séniá, Ság,    | Shainkhlh,             | Abin,          | Alim,         | Tisú,                | Unkipénu-    |              |
| Shallow,   | a. Torang,        | Pábi,                  | Lángákángde,   | .....         | Asa,                 | seni,        |              |
|            |                   |                        |                | .....         | .....                | Dikahem,     |              |



|                  |                                             |                          |                      |                       |                       |                                                  |
|------------------|---------------------------------------------|--------------------------|----------------------|-----------------------|-----------------------|--------------------------------------------------|
| Shame,<br>Share, | <i>n.</i> Láji,<br><i>v.</i> Bontá,<br>kor, | Lágikhá,<br>Bántá-khlai, | Thrágúk,<br>Thágnún, | Ajá, áchai,<br>Homin, | Méngá,<br>Kézáléché,  | Kéjómáré,<br>Kéngeno-<br>gotta,<br>Sérralogotta, |
| Sharpen,         | <i>v.</i> Dhoróá,<br>kor,                   | Soká-Pobi,               | Arsúnón,             | Nollimin,             | Kérsiché,             |                                                  |
| Shave,           | <i>v.</i> Khúruá,                           | Shin,                    | Soinún,              | Votan,                | Thésiché,             | Thégottá,                                        |
| Shield,          | <i>n.</i> Phor, Dhál,                       | Phi,                     | Chong,               | Lúmbong,              | Pézhí,                | Ki,                                              |
| Short,           | <i>n.</i> Sunti, Khatá,                     | Heibi,                   | Ajongathi,           | Achom,                | Kézza,                | Kéddi,                                           |
| Shoulder,        | <i>n.</i> Kán, Kándh,                       | Pháophrong,              | Pháng,               | Kalok,                | Búkhe,                | Abé,                                             |
| Shut,            | <i>v.</i> Bondh kor,                        | Phunghá,                 | Kángáhp,             | Nágátongin,           | Kévásiché,            | Dwánogotta,                                      |
| Sick,            | <i>n.</i> Moríá,                            | Lémdhé,                  | Késo,                | Aná,                  | Mháeli,               | Rú-gwámó,                                        |
| Silver,          | <i>n.</i> Rúp,                              | Sháthi,                  | Rúp,                 | Shúmchéung,           | Rákajé,               | .....                                            |
| Sing,            | <i>v.</i> Gánkor,                           | Réjáp,                   | Lúnglún,             | Lásan,                | Chellsiché,           | Léthéta,                                         |
| Sister,          | <i>n.</i> Bhoni,                            | Bhándaó,                 | Ningjirpi,           | Kanáomí,              | Alapvo,               | Aléki,                                           |
| Sister-in-law,   | <i>n.</i> Jéshú Khúl-<br>Púai               |                          | Korpi,               | Tovin,                | .....                 | Anó,                                             |
| Sit,             | <i>v.</i> Boh,                              | Khám,                    | Nínón,               | Gúp,                  | Bálé,                 | Bhéintá,                                         |
| Six,             | <i>a.</i> Soi,                              | Máto,                    | Thrók,               | Shom-lé-gúp,          | Súrú,                 | Séro,                                            |
| Sixteen,         | <i>a.</i> Holo,                             | Majito,                  | Kréthrok,            |                       | Kerr-o-Súrú,          | Unkipémo-<br>Séro,                               |
| Sixty,           | <i>a.</i> Háthi,                            | Bishágothám,             | Throk-ké,            | Shomgúp,              | Lhi-Súrú,             | Hain-Séro,                                       |
| Skin,            | <i>n.</i> Sal,                              | Púgur,                   | .....                | Jih,                  | .....                 |                                                  |
| Sky,             | <i>n.</i> Akáh,                             | Nákasháo,                | Sinéng,              | Vánchúng,             | Chém,                 |                                                  |
| Sleep,           | <i>v.</i> Hó, Toponijá,                     | Thuda dong,              | Inot,                | Lúmtan,               | Jibékhé,              | Jibékhé,                                         |
| Slowly,          | <i>ad.</i> Dhiré-dhiré,                     | Khéré-khé,               | Péu-péiú,            | Oicháchan,            | Rékrihe-rek-<br>rilé, | Gwén-gwén,                                       |
| Sly,             | <i>a.</i> Téngor,                           | Láthúa,                  | Kérré,               | Achingthé,            | Kessérú,              | Kessérú,                                         |
| Small,           | <i>a.</i> Horú,                             | Kháshibi,                | Bihék,               | Anéo,                 | Chi, Kéchi,           | Keshén,                                          |
| Smell,           | <i>v.</i> Húngá,                            | Márámbéi,                | Angnimdo,            | Nátan,                | Théngúsiché,          | Arréné,                                          |
| Snake,           | <i>n.</i> Hép,                              | Jibú,                    | Phirú,               | Gúl,                  | Tinh,                 | Pérré,                                           |
| So,              | <i>ad.</i> Ené, Téné,                       | E'dinú,                  | Lápú,                | Hiti,                 | Hidi,                 | Hichá,                                           |
| Son,             | <i>n.</i> Putro, Puték,                     | Anshá,                   | So,                  | Kachápá,              | N'o,                  | Nio,                                             |
|                  |                                             |                          |                      |                       |                       | Hanái<br>Achú                                    |

| English.  | Assamese.         | Kachári.              | Mikir               | Kúki.                | Angami Nágá.   | Réngmá Nágá. | Kutchá Nágá. |
|-----------|-------------------|-----------------------|---------------------|----------------------|----------------|--------------|--------------|
| Sour,     | a. Téngá,         | Mékhrí,               | Hánthor,            | Théthú,              | Khié,          | Késáang,     |              |
| Sow,      | a. Maiki gáhorí,  | Homá,                 | Phakápi,            | Vo-ánú,              | Vokrr,         | Tébohpú,     |              |
| Span,     | a. Bégot,         | Khujlá,               | Ichák,              | Kháp,                | .....          | Nka,         |              |
| Spear,    | a. Jathi,         | Chong,                | Chir,               | Téngchá,             | Réngú,         | Méi,         |              |
| Spider,   | a. Mokorá,        | Pémá, [aibá,          | Sangman,            | Mainom,              | Siré,          | Káutéroh,    |              |
| Spit,     | e. Thui-péloá,    | Khúdi-thúk-           | Kángthoknú,         | Nechilpaitan,        | Métsáchiché,   | .....        |              |
| Spleen,   | a. Jorkhapori,    | Pem, or Bothla,       | .....               | .....                | Núti,          | .....        |              |
| Square,   | a. Sari súkiyá,   | Korombri,             | Konáphili,          | Ningli,              | Pokádá,        | Péj-je,      |              |
| Stab,     | e. Khóys,         | Yéba,                 | Kétok,              | Suntan,              | Pézachi,       | Chémá,       |              |
| Star,     | a. Torá,          | Hathrái,              | Chiklo-longso,      | A-asi,               | Thémú,         | Chama,       |              |
| Steal,    | e. Sur kor,       | Kháúbá,               | Kéchonghú,          | Gítan,               | Réguléché,     | Kérrahé,     |              |
| Steam,    | a. Bháp,          | Kohúdi,               | Angui,              | Tikhú,               | Idzú melloh,   | Akénú,       |              |
| Stick,    | a. Bári, Láthi,   | Yáimú,                | Chin,               | Tingol,              | Kéthé,         | Than,        |              |
| Stone,    | a. Hil,           | Longthai,             | Arlong,             | Shong,               | Kétché,        | Cho,         |              |
| Stomach,  | a. Pét,           | Hoh, or Bubi-<br>ong, | Pok,                | Kaoi,                | Vádi, Váká,    | King,        |              |
| Straight, | a. Pón,           | Pélóngbi,             | Kékéng,             | Ajángké,             | Mézi,          | Jjji,        |              |
| Stream,   | a. Ján, Júri,     | Dishá,                | Kengsúh,<br>Lángso, | Tidung, Vá-<br>dung, | Kérr,          | Dirikéssé,   |              |
| Strength, | a. Bol, Hokti,    | Bol,                  | Yakong,             | Alat,                | Káméti,        | Arénia,      |              |
| Strike,   | e. Mār,           | Súhá,                 | Chongmún,           | Votán,               | [gin, Vosiché, | Bvútá,       |              |
| Suck,     | e. Sohá, Hohá,    | Sopá,                 | Káungip,            | Chéptan,             | Kélháléché,    | Chéntá,      |              |
| Sun,      | a. Béli,          | Sain,                 | Arni,               | Nisá,                | Náki,          | Héka,        |              |
| Swear,    | e. Hopotkhá, [dé, | Sémáidónbá,           | Sémétángmún,        | Keláchélin,          | Réswéléché,    | Chwéngottá,  |              |
| Sweep,    | e. Honrá, Jháru-  | Hasiphlái,            | Karkok,             | Théin,               | Khowáleché,    | Khogottá,    |              |
| Sweet,    | a. Hoád, Mithá,   | Kéddi, Dibi,          | Kédok,              | Alhum,               | Kémú,          | Nénú,        |              |

| Tail.     | n. Négúr. or Nez. | Pernái, or Khernmai, | or, Armé,        | Améi,        | Mi,         | Amá,            |
|-----------|-------------------|----------------------|------------------|--------------|-------------|-----------------|
| Take,     | v. Loh,           | Lang,                | Ponún,           | Lán, Látan,  | Léléché,    | Khilogottá,     |
| Tall,     | a. Lkho,          | Chohá,               | Kángtoi,         | Asangpi,     | Rékré,      | Táchosang,      |
| Tear,     | v. Pholá.         | Chikhaó,             | Ségnún,          | Loiétan,     | Kihásiché,  | Shirhéngnot-tá, |
| Ten,      | a. Doh,           | Thiaúji,             | Kép,             | Shom,        | Kerr,       | Sérráh,         |
| Testicle, | n. Phol-guti,     | Lak, Lidaodi,        | .....            | .....        | Dza,        | .....           |
| They,     | pro. Hibout,      | Hibi-Poshi,          | Látúm,           | Hitého,      | Lúko,       | Hidén,          |
| That,     | a. Ho, Hoto,      | Obo,                 | Háia,            | Hiacho,      | Lú,         | Li,             |
| Then,     | ad. Tétiyá,       | Dananghá,            | Mú,              | Hiténg,      | Tsé,        | Nchángki,       |
| There,    | ad. Táté,         | Horáhá,              | Yáialá,          | Héachún,     | Chinú Lúki, | Lúki,           |
| Thick,    | a. Dáth,          | Réiábi,              | Káthát,          | Asábébu,     | Méllóh,     | Sémépan,        |
| Thief,    | n. Sór,           | Mhkaó,               | Chonghú,         | Gúchá,       | Kéregúma,   | Kéréhénú,       |
| Thin,     | a. Pátol,         | Pábi,                | Kángar,          | Apáididé,    | Repvo,      | Répúbén,        |
| This,     | pro. Ei Eúto,     | Ebo,                 | Lá,              | Héché,       | Háho, Chú,  | Hi,             |
| Thirty,   | a. Tris,          | Bishasi-maji,        | Thomké,          | Shom-thúm,   | Serr,       | Shanrá,         |
| Thirst,   | n. Piyáh,         | Shámfráng,           | Ar-ún,           | Kálangácháé, | Térrh,      | Songni,         |
| Thorn,    | n. Kaint,         | Shú,                 | Insú,            | Líng,        | Chohú,      | Sáha,           |
| Thou,     | pro. Toi,         | Núng,                | Náng,            | Náng,        | Nó,         | Né,             |
| Thousand, | a. Héjár,         | Rijunchi,            | Súri,            | Já-shom,     | Nié,        | Shám,           |
| Three,    | a. Tiní,          | Kéthám,              | Kéthom,          | Thum,        | Sé,         | Késhán,         |
| Throw,    | v. Pélóá,         | Khéibá,              | Pélatnú,         | Paítan,      | Pétesiché,  | Phéngottá,      |
| Thunder,  | n. Gorjon,        | Nokhásoagá-rémá,     | Siningkang-ríng, | Vanágungé,   | Prthé,      | Chingashén,     |
| Thus,     | ad. Ténétoi,      | Ei E'dlái,           | Lápú,            | Hithúchú,    | Hidi,       | Jong,           |
| Tie,      | v. Bondhá,        | Khá,                 | Báknói,          | Kántan,      | Pháléché,   | Phén,           |
| Tiger,    | n. Béntásorábá,   | Raikhon,             | Téké,            | Ajé,         | Tékhú,      | Témá,           |
| To-day,   | ad. Aji,          | Tinni,               | Pinni,           | Túnin,       | Thá,        | Nthé,           |
| Toe,      | n. Bhorir angúli, | Yáshahá,             | Kéngchimún,      | Kákéng jún,  | Phichino,   | Ajongro,        |
|           |                   |                      |                  |              |             | Herrakodi Nái   |

| English.                  | Aasamese.        | Kachári.            | Mikir.              | Kúki.       | Angámi Nága.       | Réngmá Nága.   | Kutchá Nága. |
|---------------------------|------------------|---------------------|---------------------|-------------|--------------------|----------------|--------------|
| To-morrow, <i>ad.</i>     | Káli,            | Dákhná,             | Pénáp,              | Jinglé,     | Sodú,              | Séndú,         | Chonai       |
| Tongue,                   | a. Jibá,         | Sáisi,              | Dé,                 | Káiei,      | Mélla,             | I,             |              |
| Tooth,                    | a. Dánt,         | Háthái,             | So,                 | Káisi,      | Hú,                | Háh,           |              |
| Touch,                    | a. Ariyá,        | Waichéng,           | Théngthom,          | Mésél,      | Mítú,              | Máná,          |              |
| Touch,                    | v. Sós, Hát-dé,  | Káding,             | Otnún, [pi,         | Thántan,    | Bésiché,           | Hollottá,      |              |
| Tree,                     | a. Gos,          | Wongphang,          | Arong, Theng-Shing, | Thino,      | Si,                | Sén,           |              |
| Tribes,                   | a. Khél, játi,   | Shéngfong,          | Akur,               | Kahi,       | Kétho,             | .....          |              |
| Truth,                    | a. Honsa,        | Kébéi,              | Yásamét,            | Tá-ábe,     | Kérr-o-kéná,       | Késan,         | [sha,        |
| Twelve,                   | a. Báro,         | Máji-jini,          | Kré-lini,           | Shom-lé-ni, | Mékú,              | Serrah-kéhiun- | Kérré-kéná   |
| Twenty,                   | a. E'kkuri, Bis, | Bishasi,            | Nkoi,               | Shom-ni,    | Kénná,             | Nki,           | Nkai         |
| Two,                      | a. Dui,          | Gini,               | Hini,               | Ni,         | Phishiché,         | Kéhiun,        | Kénna        |
| Unbind,                   | v. Mál, Khól,    | Khrú,               | Pokutún,            | Lhamtan,    | Né,                | Tingottá,      |              |
| Uncle (Fa-ther's side) a. | Dodái,           | Adi,                | Ponú,               | Héjángá,    | Amú,               | Anio,          |              |
| Uncle (Mo-ther's side) a. | Momái,           | Maoshi,             | Pinú,               | Hénungá,    | Ajhú,              | .....          |              |
| Unite,                    | v. Mül-kor,      | Jorájú,             | Kangthún,           | Kihotavin,  | Kéméthúsi-<br>ché, |                |              |
| Unripe,                   | a. Nopoká, Kén,  | Kéthang,            | Akévé,              | Aminto,     | Mémo,              | Miémo,         |              |
| Vegetable,                | a. Há,           | Shánliá,            | Hán,                | Mé,         | Ghá,               | Hén,           |              |
| Village                   | a. Gaon,         | Nolai,              | Rongso,             | Kho,        | Rénna,             | Phén,          |              |
| Warm,                     | a. Kúhumiya,     | Túngbé,             | Párom,              | Ásá,        | Lé,                | Kéiyéng,       |              |
| Warm,                     | v. Gorumkor,     | Túngbékh-<br>láihá, | Páromnún,           | Olúmtan,    | Péleléché,         | Thikéiyéng,    |              |
| Wash,                     | v. Dhoi,         | Shú,                | Késhoknún,          | Shoptan,    | Késchúché,         | Káthú,         |              |
| Water,                    | a. Jol, Pani,    | Di,                 | Láng,               | Tú,         | Dzi,               | Di,            |              |
| Wax,                      | a. Mom, mo-hitá, | Péreshlá,           | Júir,               | Khoilú,     | Mékhwi,            | Khúchién,      |              |



*Vocabulary of the Banpará Nágas.—By S. E. PEAL, Esq., Síbságar, Ásám.*

(Continued from Journal, A. S. Bengal, Part I, for 1872, p. 29.)

In the following vocabulary á represents the *a* in *bar*; â stands for *au* as in *naught*; ai, as in *aisle*; au, as in *loud*; e, as *ei* in *eight*; é, as in *hen*; i, as in *hill*; í, as *ee* in *heel*; ó, as the *o* in *not*; o, as in *note*; u, as in *full*, and ú as *oo* in *fool*.

|             |                         |              |              |
|-------------|-------------------------|--------------|--------------|
| Abdomen,    | vók.                    | Bait,        | púsên.       |
| Able,       | túák.                   | Bamboo,      | nyad.        |
| Above,      | dinko.                  | Bank,        | shiwak túm.  |
| Ache,       | kak (kuk).              | Banyan-tree, | ngau, mú.    |
| Acid,       | mák.                    | Barn,        | púng.        |
| Across,     | árém.                   | Bark,        | pan kan.     |
| Acute,      | jún.                    | Base,        | hâtàng.      |
| Adder,      | pú.                     | Basket,      | shók shâ.    |
| Adze,       | vá.                     | Bat,         | âpak.        |
| Afraid,     | râ.                     | "            | pák pí.      |
| After,      | pai tú.                 | Battle,      | ran, rôn.    |
| Aged,       | arúpá.                  | Bead,        | lík.         |
| Air,        | vin.                    | Beam,        | páng láng.   |
| Alive,      | áráng.                  | Bean,        | pía sâ.      |
| Alike,      | táve.                   | Bear,        | tehap, chup. |
| All,        | pang ve.                | Beard,       | mun pú.      |
| Amber,      | násâ.                   | Beat,        | pít.         |
| Among,      | hótân.                  | Bec,         | nánâi.       |
| Ancestor,   | ápú.                    | Beetle,      | tehông.      |
| Angel,      | hárang.                 | Before,      | tât le.      |
| Animal,     | mai, <i>lit.</i> flesh. | Bell,        | linglo.      |
| Ankle,      | tehi ding.              | Bellows,     | zêtpú.       |
| Ant,        | tzik tzâ.               | Belly,       | vák.         |
| Antelope,   | mai ki.                 | Below,       | hápáng.      |
| Ape,        | saákáng.                | Belt,        | rú pák.      |
| Arm,        | tzak or chuk.           | Bench,       | lia.         |
| Armadillo,  | ha bit.                 | Bent,        | kúm.         |
| Arrow,      | sán.                    | Best,        | hánkú.       |
| Ashes,      | lábú.                   | Betel-nut,   | kovai.       |
| Astray,     | sam.                    | Between,     | hatàng.      |
| Atmosphere, | rang.                   | Big,         | chóng.       |
| Awl,        | jan mat.                | Bird,        | â.           |
| Away,       | pau tú, pau ha.         | Bird-cage,   | shókshâ.     |
| Axe,        | vâ.                     | Bitter,      | kâ.          |
| " (dao),    | chang, tchang.          | Black,       | nu nak.      |
| Babe,       | nâsim.                  | Blacksmith,  | cháng lík.   |
| Back,       | tâki.                   | Blanket,     | ní.          |
| Bad,        | man ma.                 | To bleed,    | adzí le,     |
| Badger,     | ran vak.                | Blind,       | dók.         |
| Bag,        | nítzúng.                | Blindness,   | mík dók le.  |

|                 |                                   |                |                                    |
|-----------------|-----------------------------------|----------------|------------------------------------|
| flood,          | adzí.                             | Cave,          | na kon.                            |
| florissom,      | púá.                              | Centipede,     | pú soí.                            |
| flue,           | nak cho.                          | Charcoal,      | mák.                               |
| foar,           | vák la, mai la.                   | Cheap,         | ná.                                |
| foil,           | tá.                               | Cheek, n.      | navèm, bomzróng.                   |
| fone,           | rzán, orzán.                      | Chest,         | khá tók. [bird]                    |
| fone,           | hórá, rá.                         | Chicken,       | á sa ( <i>lit.</i> young           |
| fough,          | panchak.                          | Chief,         | vang hum, vang sá.                 |
| foow,           | yantú.                            | Chillie, n.    | hing bú.                           |
| fox,            | shwák.                            | Chin,          | ká rá.                             |
| foy,            | nausá, man sá.                    | Chunga (Bamboo | } tún.                             |
| bracelet,       | kapsan.                           | tube,) }       |                                    |
| branch, (tree), | pan kang.                         | Chrysalis,     | chóng púa.                         |
| brandy,         | zú.                               | Claw,          | chakin.                            |
| bread,          | án.                               | Clay,          | há.                                |
| breakfast,      | kan sá há.                        | Cloth,         | ní.                                |
| breeze,         | vin.                              | Cloud,         | rang shai.                         |
|                 | { rang vin le.<br>sky wind makes. | Coal,          | ha nak.                            |
| Brick,          |                                   | Cock,          | á páng.                            |
| Bridge,         | shai.                             | Cold,          | dang.                              |
| Brimstone,      | hing.                             | Come,          | pau hi, pau he.                    |
| Bring,          | pau he, pau hai.                  | Cord,          | rú.                                |
| Broad,          | kau.                              | Corn,          | tzá.                               |
| Broken,         | pak.                              | Cost,          | lái.                               |
| Brook,          | shwa sa.                          | Cotton,        | pai.                               |
| Broom,          | hàjá.                             | Cough,         | áhai le.                           |
| Brother,        | átai.                             | Countenance,   | tún.                               |
| Brow,           | kong ra.                          | Cow,           | mai hú.                            |
| Buffalo,        | lúí.                              | Crab,          | shán.                              |
| „ wild,         | lúí hing.                         | Crack,         | hak (hak le).                      |
| Bug,            | ve koi.                           | Crag,          | há húng.                           |
| Bull,           | mai hú, hapang.                   | Creeper,       | rú ká.                             |
| To Burn,        | van súng le.                      | Cricket,       | do mo.                             |
| Burial,         | rúk túá.                          | Crocodile,     | kún kí.                            |
| Bush,           | pau ká.                           | Crook,         | kúm.                               |
| Butterfly,      | pí twák.                          | Crossbow,      | háp.                               |
| Cable,          | rú.                               | Crow,          | áká.                               |
| Cake,           | án, án.                           | Cucumber,      | mai kú.                            |
| Calamus,        | re.                               | Cushion,       | káng tai.                          |
| Calf,           | mai hú sá.                        | Cut, v.        | hut ko, hat ko.                    |
| Camphor,        | shá.                              | Cymbal,        | sí.                                |
| Cane,           | re.                               | Dagger,        | bít sa.                            |
| Cannon,         | ján túá.                          | Damp,          | shún.                              |
| Canoe,          | kwá sá.                           | Dance,         | ázai.                              |
| Cap,            | kohom.                            | Dancing,       | ázai le.                           |
| Carcass,        | zí le ( <i>lit.</i> dead is).     | Dark,          | núk, nak.                          |
| Cascade,        | tí chóng le.<br>(water great is). | Darkness,      | { rang núk le.<br>sky black makes. |
| Cat,            | míá.                              | Dart,          | ná hí.                             |
| Caterpillar,    | tchóng.                           | Daughter,      | á phe.                             |
|                 |                                   | Dawn,          | shom shák.                         |

|               |                         |             |                           |
|---------------|-------------------------|-------------|---------------------------|
| Day,          | túng tá.                | Escape,     | pau le.                   |
| Dead,         | zí, jí.                 | Evening,    | hang shang.               |
| Deaf,         | na ba.                  | Ever,       | pang vai.                 |
| Dearth,       | no le.                  | Exact,      | hút zing.                 |
| Death,        | zi.                     | Expanse,    | man kam.                  |
| Debt,         | tá.                     | Extinguish, | a mut le.                 |
| Deep,         | zú.                     | Eye,        | mí.                       |
| Deer,         | mai, <i>lit.</i> flesh. | Face,       | tún.                      |
| Deity,        | há ríng.                | Fall,       | dat le.                   |
| Deluge,       | tí chóng le.            | False,      | man pai.                  |
| Demon,        | lún pú.                 | Family,     | horiém.                   |
| "             | harang mun nu           | Famine,     | ná le.                    |
| Dense,        | ping.                   | Fan,        | rang zêp.                 |
| Depart,       | pau há.                 | Far,        | átai.                     |
| Descend,      | jú dú.                  | Father,     | ápá.                      |
| Dew,          | rang phúm.              | Feast,      | mí tú le.                 |
| Diarrhoea,    | mong chai le.           | Feather,    | â koi.                    |
| Die,          | zi, zí le               | Fence,      | jávát.                    |
| Dig,          | há tá le.               | Fern,       | tak shoi.                 |
| Dike,         | shwá tá há.             | Fever,      | kak.                      |
| Dinner,       | po sa há.               | Few,        | lí.                       |
| Dish,         | kap ku.                 | Fig,        | púk ják.                  |
| Distant,      | ántai le. atai le.      | Fin,        | nyék kan.                 |
| Ditch,        | shwa kun.               | Finger,     | cháki.                    |
| Don't,        | támuk.                  | Finish,     | mui.                      |
| Dog,          | hí.                     | Fire,       | van (vun).                |
| Done,         | m'ui (mui le).          | Firewood,   | há.                       |
| Door,         | káhák.                  | Firmament,  | rang.                     |
| Dore,         | â shú.                  | Fish,       | nya.                      |
| Drake,        | â pák pong.             | Flannel,    | ní.                       |
| Drink,        | ling.                   | Flat,       | tam kak.                  |
| Drown,        | zí le.                  | Flea,       | tseli.                    |
| Drum,         | sám.                    | Flesh,      | mai í.                    |
| Dry,          | rán.                    | Flint,      | van hong (fire<br>stone). |
| Duck,         | â pak nú.               | Flood,      | tí chong le.              |
| Ear,          | ná.                     | Flour,      | án, á.                    |
| Early,        | rang ai le.             | Flower,     | púa, mai pua.             |
| Earth,        | há.                     | Flute,      | toá pit.                  |
| Earthen-ware, | páke.                   | Fly,        | hát.                      |
| Earthquake,   | shi le, mífí.           | Foot,       | chia.                     |
| Eat,          | sa le.                  | Footstep,   | chiá títng mán.           |
| Eclipse,      | rang phú.               | Forest,     | pau.                      |
| Edge,         | chung h na.             | Foul,       |                           |
| Eel,          | nya { kan<br>lú.        | Frog,       | lúk.                      |
| Egg,          | â tí.                   | Fruit,      | pan ják.                  |
| Elastic,      | lá le.                  | Fuel,       | há.                       |
| Elbow,        | chak lo.                | Fur,        | mún.                      |
| El-phant,     | loak.                   | Gale,       | rang tai.                 |
| Equal,        | tam vai.                | Gander,     | â chong.                  |
| Erect,        | á jóng.                 | Gate,       | ká hák.                   |



|              |                       |            |                                  |
|--------------|-----------------------|------------|----------------------------------|
| Giant,       | mí chónḡ.             | Javelin,   | pá.                              |
| Girl,        | shí kú.               | Jaw,       | ká.                              |
| Gnat,        | mún kau.              | Joint,     | tsá vát.                         |
| Go,          | pau lá, pau há.       | Jump,      | pat.                             |
| Goat,        | roan.                 | Jungle,    | paú.                             |
| God,         | há ráng,              | Kid,       | roan sá.                         |
| Gold,        | sién.                 | King,      | vang ham.                        |
| Good,        | mai mai le.           | Kitten,    | míá sá.                          |
| Goose,       | á chónḡ.              | Knee,      | chí kúf.                         |
| Grain,       | tzá.                  | Knife,     | bít sá.                          |
| Granary,     | púng.                 | Knot,      | lúng ká.                         |
| Grass,       | híng.                 | Knuckle,   | chakí.                           |
| Grasshopper, | do mo.                | Ladder,    | chí túng.                        |
| Great,       | chónḡ.                | Lake,      | núánú jí.                        |
| Grief,       | on.                   | Lance,     | chí áp aí le.                    |
| Gum,         | ta.                   | Large,     | chong, chong le.                 |
| Gun,         | ján túá.              | Lazy,      | húrúk.                           |
| Gunpowder,   | kat.                  | Lead,      | jántáng.                         |
| Hail,        | jún.                  | Leaf,      | pan chak, <i>lit.</i> tree-hand. |
| Han,         | ká, ko.               | Leech,     | vát.                             |
| Half,        | hat (hut le).         | Leg,       | chiá.                            |
| Hand,        | chak, chák.           | Leopard,   | tzínák, chánák.                  |
| Handle,      | chang ko.             | Lift,      | pai pau le.                      |
| Hard,        | tiák.                 | Lightning, | rang dung le.                    |
| Hatchet,     | cháng.                | Lizard,    | hát, hàat, pelo ?                |
| Head,        | khung.                | Locust,    | kak.                             |
| Heavy,       | lí le.                | Long,      | là le.                           |
| Heel,        | chídun.               | Loose,     | nai lí.                          |
| Hen,         | á nu.                 | Lost,      | má lí.                           |
| High,        | tang lí.              | Loud,      | ní á lúng.                       |
| Hill,        | hapa.                 | Low,       | hátáng.                          |
| Hinder,      | pai kí.               | Mad,       | bo le.                           |
| Hip,         | ke rong.              | Man,       | mí.                              |
| Hoe,         | há.                   | Many,      | tai hú le.                       |
| Hog,         | vák lá.               | Mat,       | dam.                             |
| Honey,       | na tí (bee-water).    | Meat,      | maíí.                            |
| Hornbill,    | árzá.                 | Medicine,  | híng.                            |
| Hornet,      | lím.                  | Middle,    | hótán.                           |
| Horse,       | mán.                  | Milk,      | tzam tí.                         |
| Hot,         | kám.                  | Mire,      | hátam.                           |
| House,       | ham (humm).           | Mist,      | rang phúm.                       |
| Hunger,      | { vok no le.          | Mole,      | teha tchú, tú pá.                |
| Hurricane,   | { stomach nothing is. | Molasses,  | nam síng.                        |
| Husband,     | rang chai.            | Monkey,    | mai nák.                         |
| Hut,         | hasam pa.             | Month,     | á chang.                         |
| Instep,      | pam.                  | Moon,      | lénú.                            |
| Iron,        | chi tok.              | More,      | á tá.                            |
| Ivory,       | ján.                  | Mother,    | á nú.                            |
| Jackall,     | { loák vá.            | Mouth,     | tún.                             |
|              | { elephant tooth.     | Mud,       | há tam.                          |
|              | hian.                 |            |                                  |

|                 |               |              |                    |
|-----------------|---------------|--------------|--------------------|
| Nail,           | chakín.       | Samber deer, | tchók.             |
| Narrow,         | tík.          | Same,        | tam rí.            |
| Navel,          | súng.         | Sand,        | sák.               |
| Neck,           | dinkú.        | Seed,        | hâtúng.            |
| Needle,         | mat koi.      | Sharp,       | áná.               |
| Nest,           | â zap.        | Shell,       | káptúng.           |
| New,            | haz án.       | Short,       | tút, tut le.       |
| Night,          | { rang nak.   | Shoulder,    | swa kong.          |
| No,             | { sky black.  | Shrew,       | tsá tsú.           |
| North,          | man tai le.   | Sick,        | kak.               |
| Nose,           | nga.          | Silent,      | dáng.              |
| Not,            | nákúng        | Silk,        | shóng.             |
| Old,            | man.          | Silver,      | ngúng.             |
| Otter,          | haz áng.      | Sister,      | á ná.              |
| Path,           | rá rom.       | Skin,        | kan.               |
| Perpendicular,  | lam.          | Sky,         | rang.              |
| Pig,            | á jóng.       | Sleep,       | mik nú, mik nu le. |
| Pigeon,         | vák.          | "            | zip, zip le.       |
| Plantain,       | yâ.           | Slip,        | nan.               |
| Point,          | nga.          | Small,       | hí le.             |
| Pond,           | júng.         | Smoke,       | van kút.           |
| Porcupine,      | tí kut.       | Snake,       | pú.                |
| Porpoise,       | â zí.         | Soft,        | naí.               |
| Pull,           | te it ?       | Son,         | ko sá.             |
| Quail,          | lín pau he.   | Sour,        | tsánam.            |
| Quick,          | â muk.        | Spear,       | pá.                |
| Rain,           | kí kí.        | Spider,      | mák.               |
| To Rain,        | rang vat.     | Spirit,      | zú.                |
| Rat,            | rang vat le.  | Squirrel,    | ú rút.             |
| Raven,          | jú, zú.       | Star,        | litzú.             |
| Raw,            | â lá.         | Stay,        | támúk.             |
| Red,            | árang.        | Steel,       | jántú.             |
| Rhinoceros,     | khí.          | Stone,       | lóng.              |
| Rice, as grain, | mai nú.       | Stop,        | támúk, zákal.      |
| " husked,       | tzá.          | Storm,       | rang chai le.      |
| " boiled,       | vóng.         | Straight,    | jang mai.          |
| Ripe,           | sa.           | Straw,       | tásá.              |
| River,          | júm.          | Stream,      | swaká.             |
| " small,        | shwa ko.      | Sunshine,    | rang han.          |
| Road, large,    | shwa nú.      | Sweet,       | tí.                |
| " small,        | lum, lum twa. | Take,        | pau tú.            |
| Rock,           | lum nú.       | Tank,        | tí kút.            |
| Roof,           | lóng.         | Thick,       | tat.               |
| Root,           | ham tok.      | Thin,        | ák.                |
| Rope,           | pan ting.     | Thirst,      |                    |
| Rum,            | rú.           | Thorn,       | húk.               |
| Rust,           | zú.           | Throat,      | dín kú.            |
| Sago,           | yán, ján.     | Thunder,     | rang dúng.         |
| " large,        | zí.           | Tiger,       | tchánú, cháná.     |
| Salt,           | zók.          | Tight,       | chuk le.           |
|                 | hám.          | Tobacco,     | há hing.           |

|            |                    |                  |                   |
|------------|--------------------|------------------|-------------------|
| To-day,    | á ní.              | 8.               | a chut, chut.     |
| Toe,       | chíkí.             | 9.               | a kú, kú.         |
| To-morrow, | nai ní.            | 10.              | a bn, bn.         |
| Tongue,    | lé.                | Come,            | pau hí.           |
| Tooth,     | vá.                | Go,              | pau la.           |
| Tough,     | kai.               | Pull,            | lin he.           |
| Tree,      | pan.               | Lift,            | pai ha.           |
| Tribe,     | nok,               | Take,            | " tu.             |
| Truce,     | mímúl.             | Bring,           | la he, pau he.    |
| True,      | hotzing.           | Bring water,     | tí la he.         |
| Unable,    | mun tuak.          | Bring fire,      | va chup hai.      |
| Vegetable, | súi.               | Bring fuel,      | he la hai.        |
| Village,   | tíng kong.         | "                | ha pau hai.       |
| Waist,     | khê da.            | Bring more,      | lá hai.           |
| Wait,      | támúk.             | Bring men,       | mí jen hai.       |
| Water,     | tí.                | What's that?     | tem áváng?        |
| Wax,       | mú.                | What hill?       | tem hápá?         |
| Weasel,    | â kan.             | What stream?     | tem swáka?        |
| Weed,      | pau.               | What tree?       | tem pan ai?       |
| Well,      | tí kái.            | What name?       | bílám an pú.      |
| Wet,       | kah le.            | What's this?     | hai tem ai?       |
| What?      | tem.               | How large?       | ávát chong pú.    |
| Wind,      | vin.               | How far?         | ávát tá tai pú.   |
| Wolf,      | shán.              | "                | abat ta.          |
| Woman,     | shí kú.            | What making?     | tem zing pú?      |
| Wool,      | roan mú.           | Why?             | tem mók pú.       |
| Wrist,     | chak { lo<br>ding. | Where come from? | azang to pia?     |
| Yam,       | tong.              | " "              | tem tung oi pú.   |
| Yes,       | tai le.            | Where gone to?   | o ma ai o man pú? |
| Young,     | sá.                | Are there deer?  | mai te chá?       |
| 1.         | e tá, tá.          | Are there fish?  | nya te chá?       |
| 2.         | a ní, ní.          | Yes,—good,       | tai le—mai.       |
| 3.         | a jam, jum.        | No—bad,          | man tai—man mai.  |
| 4.         | a lí, lí.          | None,            | man tai le.       |
| 5.         | a gá, gá.          | Cut this,        | hut ko.           |
| 6.         | a rok, rok.        | Throw this rub-  |                   |
| 7.         | a nat, nut.        | bish away,       | avátko vúng va.   |
|            |                    | Work quick,      | kí ki le.         |

This is mainly Banpará Nágá. Contiguous tribes often have so many words in common as to be able to converse; while in other cases the differences are so great, that the dialects are mutually unintelligible.

The letter *r* at end of a word seems rare, so far I have not met a single case, and I am inclined to think it is never used, inasmuch as all Assamese words used by them that so end, have the final *r* turned into *t*, as *khar* (gunpowder) to *khat*, *kapor* (cloth) into *kaput*, &c.



JOURNAL  
OF THE  
ASIATIC SOCIETY OF BENGAL.



VOL. • XLII.  
PART II. (NATURAL HISTORY, &c.)  
(Nos. I to IV.—1873.)

EDITED BY  
THE HONORARY SECRETARIES.

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"It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease." SIR WM. JONES.

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CALCUTTA :  
PRINTED BY G. H. ROUSE, BAPTIST MISSION PRESS.  
1873.

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# LIST OF CONTRIBUTORS.

|                                                                                                                                                            | Page |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| BLANFORD, W. T.;—Note on the genus <i>Gymnops</i> , W. Blanf., ( <i>Lacertidae</i> ),.....                                                                 | 144  |
| BROOKS, W. E.;—On an undescribed species of <i>Lophophanes</i> ,.....                                                                                      | 57   |
| —————;—On <i>Aquila bifasciata</i> and <i>Aquila orientalis</i> ,....                                                                                      | 145  |
| —————;—Notes on the <i>Certhiinae</i> of India, .....                                                                                                      | 255  |
| DOBSON, G. E.;—On the <i>Pteropidae</i> of India and its islands, with descriptions of new or little-known species (with Pl. XIV),....                     | 194  |
| —————;—Description of a new species of <i>Vespertilio</i> from the North-Western Himalaya,.....                                                            | 205  |
| KURZ, S.;—New Burmese Plants, Part II, (with Pls. VIII, IX, X),                                                                                            | 59   |
| —————;—New Burmese Plants, Part III, (with Pls. XVIII, XIX),.....                                                                                          | 227  |
| SCHWENDLER, L.;—On differential Galvanometers, .....                                                                                                       | 1    |
| STOLICZKA, F.;—On the Landshells of Penang Island with descriptions of the animals and anatomical notes; part second, <i>Helicacea</i> (Pls. I-III), ..... | 11   |
| —————;—Notes on some species of Malayan Amphibia and Reptilia (with Pl. XI).....                                                                           | 111  |
| —————;—Notes on the Indian species of <i>Thelyphonus</i> (with Pl. XII), .....                                                                             | 126  |
| —————;—Contribution towards a Monograph of the Indian <i>Passalidae</i> , .....                                                                            | 149  |
| —————;—Note on some Andamanese and Nicobarese Reptiles with the description of three new species of Lizards,.....                                          | 162  |
| —————;—Description of two new species of Indian Landshells, .....                                                                                          | 169  |
| THEOBALD, W.;—Description of new species of <i>Unionidae</i> (with Pl. XVII), .....                                                                        | 207  |
| WALDIE, D.;—On the muddy water of the Hugli during the rainy season with reference to its purification and to the Calcutta Water supply, .....             | 210  |
| WOOD-MASON, J.;—On <i>Nephropsis Steuarti</i> , a new genus and species of Macrurous crustaceans (with Pl. IV), .....                                      | 39   |
| —————;—On new or little known species of <i>Phasmida</i> , Part I, genus <i>Racillus</i> , (with Pls. V, VI, VII), .....                                   | 45   |
| —————;—On <i>Rhopalorkhynchus Kröyeri</i> , a new genus and species of <i>Pyanogonida</i> , (with Pl. XIII), .....                                         | 171  |
| —————;—On a new genus and species ( <i>Hylæocarcinus Humei</i> ) of Landerabs from the Nicobar Islands (with Pls. XV, XVI.), .....                         | 255  |

*Date of issue of the different numbers of Part II, Journal.*

No. I,—containing pp. 1—57, with pls i—vii—was issued on 30th April, 1873.

No. II,—containing pp. 59—147, with pls. viii—xii—was issued on 28th May, 1873.

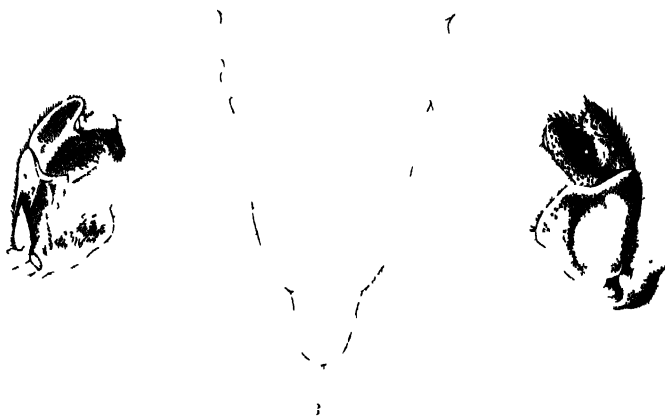
<sup>6</sup>No. III,—containing pp. 149—206, with pls. xiii—xiv—was issued on 8th September, 1873.

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1



2

HYLÆOCARCINUS HUMEI



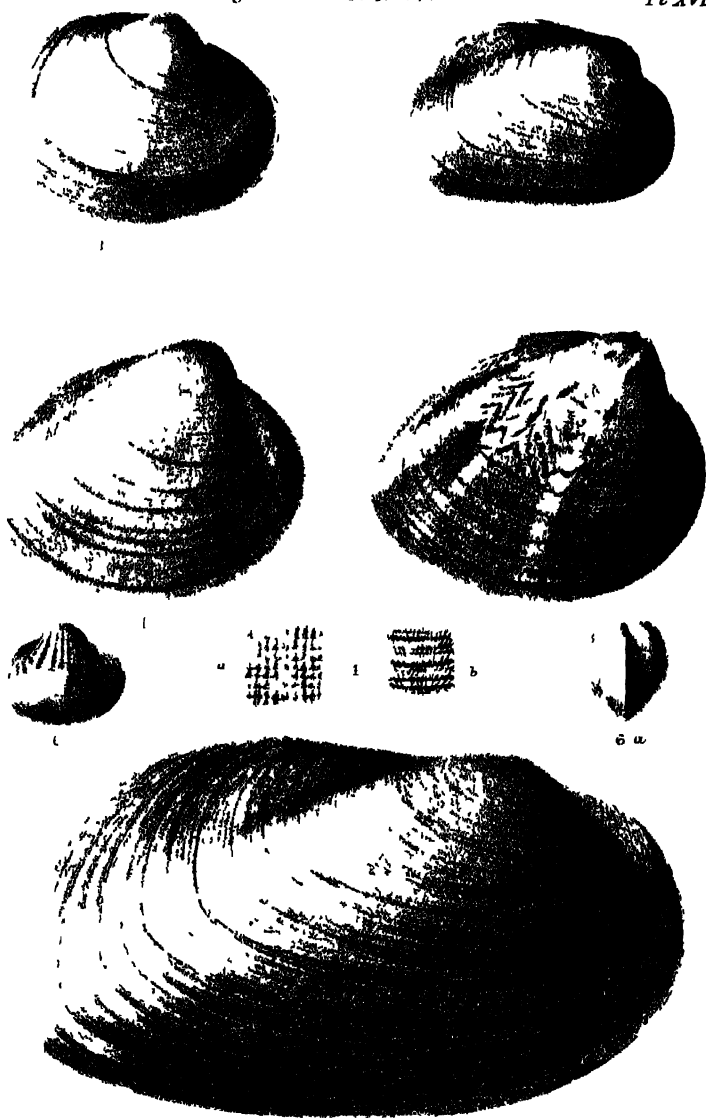
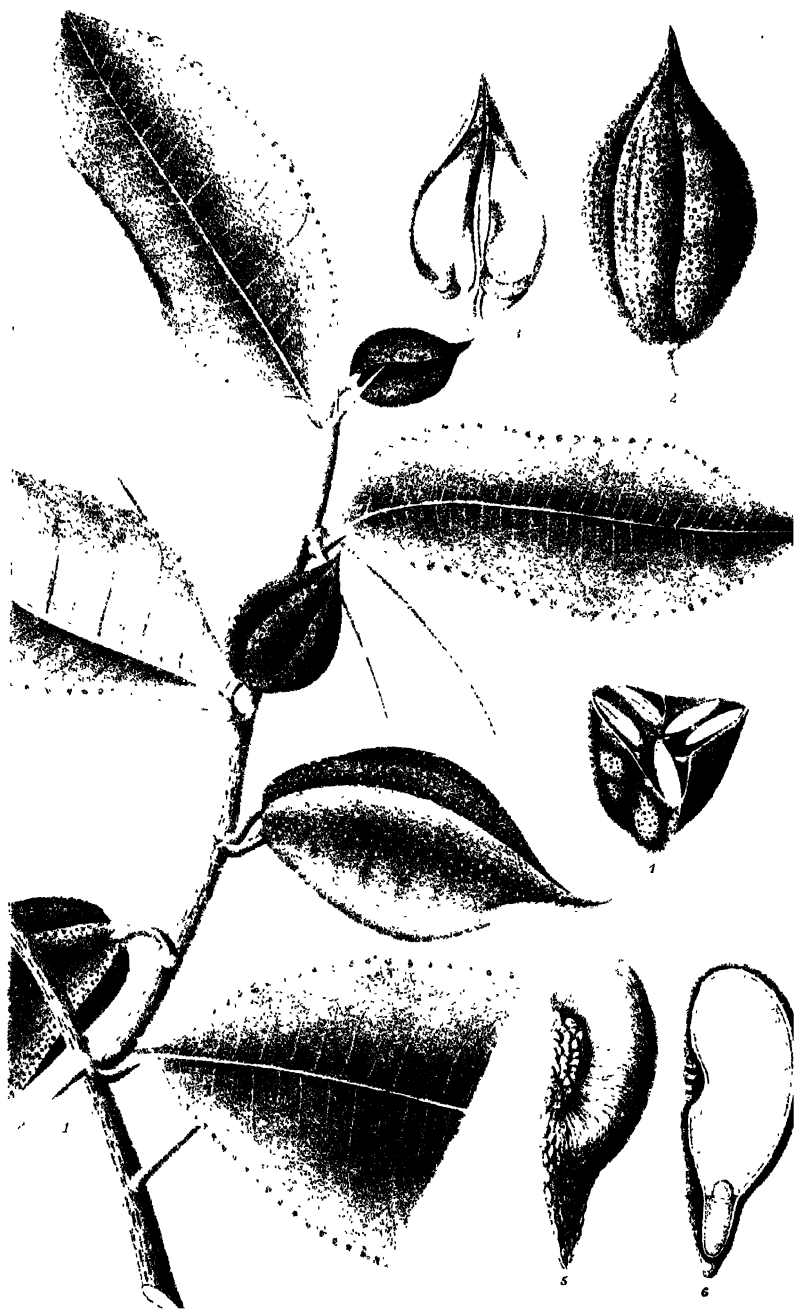


Fig 1 *Unio Bhamburda*  
 1 *Marshallensis*  
 1 *Fiddens*

Fig 4 *Unio howhallaensis*  
 4 b 1' *crispiculatus* Bens  
 5 *Monochondylaea* Ave

Fig 6 *Sphaerium Avatum*













# I N D E X.

Names of new genera and species have an asterisk (\*) prefixed.

- Ablabes flaviceps*, 112, 111. 123  
 " *melanocephalus*, 123  
*Acanthoderus bicoronatus*, 45  
 " *lacertinus*, 15  
 " *semiararmatus*, 45  
*Acanthus*, 98  
*Aceraius emarginatus*, 158  
 " *grandis*, 158, 159  
*Acranthera*, 77  
*Adeniophis* ('*allopia*') *bivirgatus*, 115  
 " *intestinalis*, 115  
*Adenosacme*, 78  
*\*Atelia retusa*, 73  
*Agapetes setigera*, 84  
 " *variegata*, 84  
*Atalantia*, 228  
*\*Albizia glomeriflora*, 74  
*Allocomorphia*, 80  
*Amphicarpea ferruginea*, 232  
*Andiographia*, 100  
*Anisoptera marginata*, 4  
 " *glabra*, 61  
*\*Anneslea monticola*, 59  
*Aidia floribunda*, 87  
 " *Helfferiana*, 86  
 " *nerifolia*, 87  
 " *rigida*, 87  
 " *serrulata*, 87  
*Argostema*, 79  
*\*Ariallia*, 70  
 " *robusta*, 71  
*Asystasia*, 99  
*Atalantia longispina*, 228  
*Aulacocyclus teres*, 152  
 " *Parryi*, 150  
*Bacillus* *Artemia*, 46, 51  
 " *aspericollis*, 46  
 " (*Baculum*) *Artemia*, 51  
 " *carinulatus*, 46, 55  
 " (*Baculum*) *caniculus*, 54  
 " *fuscolineatus*, 46  
 " (*Baculum*) *farcellatus*, 54  
 " *Gerhardii*, 46  
 " *gramineus*, 46  
 " *Geisovii*, 46  
 " *Guenzii*, 46  
 " *hispidulus*, 47  
 " *humilis*, 55  
*Bacillus* (*Baculum*) *Hypheroon*, 54  
 " *insignis*,  
 " *leprosus*, 46  
 " (*Baculum*) *Penthesilea*, 52  
 " (*Baculum*) *ramosus*, 46  
 " *laevigatus*, 49  
 " *oxytenes*, 48  
 " *patellifer*, 46, 51  
 " *Regulus*, 49  
 " (*Ramulus*) *Humberti*, 46  
 " *scabriusculus*, 55  
 " *scytale*, 46, 55  
 " *Westwoodii*, 50  
*Bambusa Helferi*, 253  
 " *longispatha*, 252  
 " *Maclellandii*, 253  
 " *polymorpha*, 251  
 " *stricta*, 251  
*Barleria*, 98  
 " *stenophylla*, 95  
*\*Barringtonia Augusta*, 233, 234  
 " *pterocarpa*, 234  
*\*Basilianus Andamanensis*, 160, 161, 162  
 " *cancrus*, 157, 160, 162  
 " *Cantoris*, 159, 161  
 " *inaequalis*, 159  
 " *indicus*, 159  
 " *Nilgheriensis*, 159  
 " *Sikkimensis*, 161  
*Bauhinia brachycarpa*, 73  
 " *involutellata*, 72  
 " *monandra*, 70  
 " *ornata*, 72  
 " *rosea*, 72  
 " *tomentosa*, 73  
 " *Vahlhii*, 72  
*Begonia*, 82  
 " *nivea*, 81  
 " *subperfoliata*, 81  
 " *velutina*, 81  
*Berrya mollis*, 62  
*Blepharis*, 98  
*Bombax insignis*, 61  
 " *Malabarica*, 61  
*Bones Brandisiana*, 66  
 " *Burmanica*, 66  
*Bronchocela cristatella*, 113  
*\*Brucea mollis*, 64

- Bufo asper*, 113  
*Bufo melanostictus*, 112, 163  
*Bulinus atricallosus*, 27  
     " *interruptus*, var. *citrinus*, 27  
     " *Nicobaricus*, 163  
*Bungarus fasciatus*, 115  
*\*Capparis crassifolia*, 227  
     " *horrida*, 227  
     " *polymorpha*, 227  
*Calonias Nicobaricus*, 163  
*Calamaria Linnæi*, 120  
*\*C. Stahli knechti*, 114, 119  
*Callula pulchra*, 114  
*Calocuris MacAndrewæ*, 40  
*Camburus pellucidus*, 40  
*Canthium*, 76  
*Cardianthera*, 101  
*Carparea*, 82  
*Carpophaga bicolor*, 163  
*Carpopogon bracteatus*, 231  
*Cassia renigera*, 71  
*Cephalanthus*, 79  
*\*Cephalostachyum flavescens*, 252  
*Cephaelis*, 75  
     " *pergracile*, 252  
*\*Ceracupes Austeni*, 151  
     " *fronticornis*, 151  
*Ceratostemma miniatum*, 85  
     " *variegatum*, 84  
*Cerberus rhynchops*, 115, 162  
*Certhia discolor*, 255  
     " *familiaris*, 255, 257  
     " *Himalayana*, 255  
     " *Hodgsoni*, 255  
     " *Mandellii*, 256, 257  
     " *Nipalensis*, 255, 256, 257  
     " *Stoliczkae*, 256, 257  
*\*Cetejus Australiensis*, 157  
*Chasalia*, 75  
*Chickrassia velutina*, 65  
*\*Chloranthus insignis*, 108  
*Chrysopelea ornata*, 114  
     " *rubescens*, 114  
*Citrus angulatus*, 228  
*\*Clausilia (Phædusa) filicostata*, 28  
     " *gouldiana*, 28  
     " *insignis*, 20  
     " *javana*, 29  
     " *(Phædusa) Penangensis*, 27  
     " *Philippiana*, 28  
     " *Sumatrana*, 28  
*Coffea*, 76  
*Columbia floribunda*, 63  
*Comacupes basalis*, 151, 152  
     " *caricornis*, 152  
     " *cylindraceus*, 151  
     " *Felderi*, 152  
     " *Masoni*, 152  
*Comptosoma (Elaphis) melanurum*, 114  
     " *radiatum*, 114  
*Crocodilus porosus*, 113  
     " *Pondicherianus*, 113  
*Crossandra*, 98  
*\*Crotalaria Kurzii*, 229  
*Cyclophus tricolor*, 114, 122  
*Cyclophorus Nicobaricus*, 163  
*Cylindrophis rufus*, 114  
*Cylicodaphne Wightiana*, 102  
*Cynonycteris amplexicaudata*, 200, 202, 203  
*Cynopterus affinis*, 200  
     " *brachysoma*, 202, 203  
     " *marginatus*, 200, 201, 203  
     " *Sherzeri*, 201, 203  
     " *Andamanensis*, 201, 203  
*\*Cynonycteris minor*, 203  
*Cyrotodactylus affinis*, 113  
     " *rubidus*, 163  
*Cystacanthus*, 100  
*Daedalacanthus*, 99  
*Dalbergia cana*, 70  
     " *glomeriflora*, 70  
*\*Daphnidium argenteum*, 103  
*Decaschistia crassiuscula*, 227  
*Dendrophis caudolineatus*, 114, 123, 162  
     " *octolineatus*, 121  
     " *pictus*, 114, 162, 163  
     " *terrificus*, 162  
*Dentella*, 79  
*\*Desmodium angulatum*, 231  
     " *auricomum*, 230  
     " *reniforme*, 230  
     " *oblatum*, 230  
     " *obcordatum*, 229  
     " *strangulatum*, 230  
     " *triflorum*, 230  
*Decaschistia crotonifolia*, 227  
*Dieliptera*, 100  
*Dibamus Nicobaricus*, 168, 169  
     " *Novae-guineæ*, 168  
*Dimetia*, 80  
*\*Dinochloa Andamanica*, 253  
     " *ciliata*, 253  
     " *Maclellandii*, 253  
     " *Tjangkorreh*, 253  
*\*Diospyros sapotoides*, 88  
     " *undulata*, 88  
*Diplopelma Berdmorei*, 114  
     " *Carnaticum*, 114  
*Diplospora*, 77  
*Dipsas cynodon*, 114  
     " *dendrophila*, 114  
     " *Drapiezii*, 114  
*\*Dorstenia Griffithiana*, 104  
*Draco abbreviatus*, 119  
     " *fimbriatus*, 113, 119  
     " *quinquefasciatus*, 112, 113, 118  
     " *volans*, 113  
*Dysodideudron*, 76  
*Ebermaiera*, 101  
*Echoliolum*, 99  
*\*Elatostema bulbiferum*, 104  
     " *gibbosum*, 104  
     " *lineolatum*, 104  
     " *membranifolium*, 104

- Eleutherura marginata*, 200  
*Ennea bicolor*, 33  
 \**ONYCTERIS*, 204  
*Onycteris spelaea*, 204  
*Epicrium glutinosum*, 113  
*Episphenus Moorei*, 150  
*Eranthemum*, 99  
*Eriocnemis monticulosus*, 155  
     " *tridens*, 155  
 \**Erythrina holosericea*, 69  
     " *lithosperma*, 69, 70  
     " *Sumatrana*, 70  
 \**Eugenia cerasiflora*, 233  
     " *grandis*, 233  
     " *lanceifolia*, 233  
     " *pachyphylla*, 232  
     " *tristis*, 233  
 \**Eupropes carinatus*, 113, 163  
     " *olivaceus*, 113, 118  
     " *rufescens*, 113  
     " *macrootis*, 163  
*Eurostus alternans*, 126  
*Evodia viticina*, 64  
*Ferania Sieboldi*, 125  
*Ficus affinis*, 105  
     " *anastomozans*, 107  
 \* " *caloneura*, 106  
 \* " *geniculata*, 105  
     " *lepidosa*, 107  
     " *infectoria*, 105  
 \* " *insignis*, 105  
     " *ischnipoda*, 107  
     " *pomifera*, 106  
 \* " *pyrrhocarpa*, 106  
     " *rhododendrifolia*, 105  
     " *Rumphii*, 106  
     " *tuberculata*, 106  
*Fordonia unicolor*, 115  
*Fruticola similaris*, 26  
*Galium*, 75  
*Gardenia*, 77  
*Gecarcinus ruricola*, 259  
*Gecko guttatus*, 113  
     " *stentor*, 113  
*Geophila*, 75  
*Gigantochloa aspera*, 251  
 \* " *macrostachya*, 251  
*Gonates Germarii*, 158  
     " *naviculator*, 157  
*Goniosoma oxycephalum*, 114, 123  
 \**GONOCITRUS*, 228  
     " *angulatus*, 228  
*Graptophyllum*, 100  
*Greenia*, 79  
*Grewia columnaris*, 63  
     " *humilis*, 63  
     " *microstemma*, 63  
     " *odorata*, 63  
     " *pilosa*, 63  
     " *retusifolia*, 63  
     " *scabrida*, 63  
     " *umbellata*, 63  
*Griffithia*, 77  
 \**Gronia flicaulia*, 232  
*Gronia Grahamii*, 232  
*Guettarda*, 77  
 \**Gunisanthus mollis*, 88  
*Gymnodactylus pulchellus*, 113, 118  
     " *Wickelii*, 165  
     " *Gymnops microlepis*, 144  
     " *meizolepis*, 144  
 \**CHONDROPHIOLA*, 144  
*Gynochthodes*, 78  
*Hapaline*, 109  
     " *Benthamiana*, 109  
*Haplanthus*, 101  
*Hedyotis*, 80  
 \**Helicarion permolle*, 18  
 \**Helicia pyrrhobotrya*, 103  
*Helicina Dunkeri*, 163  
*Helicteres lanceolata*, 62  
     " *obtusata*, 62  
     " *virgata*, 62  
*Helix cantoriensis*, 22  
     " *capitum*, 20  
     " *castra*, 20, 21  
     " *bolus*, 26  
     " *cymatium*, 11  
     " *hemiopta*, 26  
     " *planorbis*, 20  
     " *propinqua*, 26  
     " *sculpturrita*, 26  
     " *sinularis*, 26  
     " *tricarinata*, 26  
     " *trochiformis*, 20  
     " *Zoroaster*, 26  
*Hemidactylus*, 101  
*Hemidactylus (Doryura) Berdmoroi*, 114  
     " *frenatus*, 113, 165  
*Hemigraphis*, 99  
     " *glandulosa*, 92  
 \**HEMIOBCHIS*, 108  
     " *burmanica*, 108  
 \**Heritiera macrophylla*, 61  
 \**Heterophragma sulfurea*, 80  
*Hinulia maculata*, 114  
*Hipistes hydrinus*, 115  
 \**Hiptage arborea*, 228  
*Homalopsis bucata*, 115  
     " *decussata*, 125  
*Hopea diversifolia*, 61  
     " *floribunda*, 60  
     " *gratissima*, 61  
     " *Griffithii*, 60  
     " *jucunda*, 61  
*Hydnophytum*, 75  
 \**Hydrobryum lichnoides*, 108  
*Hydrophis robustus*, 115  
*Hydrophylax*, 80  
*Hydrosaurus salvator*, 113, 113  
*Hylarana erythraea*, 114  
     " *Tytleri*, 114  
 \**HYLROCARCINUS*, 259  
     " *Humei*, 260

- Hymenodyction, 79  
 Hymenopogon, 79  
 Hypobathrum, 77  
 Hypsirrha enhydria, 115  
 Hypsirrha (Feria) alternans, 115, 125  
     " Bocourti, 125  
     " plumbæ, 115  
 Hyptianthera, 77  
 Hygrophila, 101  
 Indigofera Brunoniana, 229  
   \* " caloneura, 229  
 Isonandra calophylla, 88  
 Incillaria bilineata, 80  
 Ixora, 76  
 Justicia Atkinsoniana, 96  
   \* " caloneura, 96  
   \* " flava, 97  
   \* " dasycarpa, 96  
   \* " speciosa, 97  
 Keliella Barrackpoorensis, 20  
 Knoxia, 80  
 Laches Comptonii, 158  
   \* " gracilis, 156  
 Lagerstræmia flos reginæ, 234  
   \* " macrocarpa, 234  
   \* " villosa, 234  
 Lasianthus, 76  
 \*Leea compactiflora, 65  
     " cordata, 66  
     " gigantea, 65  
     " lata, 65  
     " sanguinea, 66  
 Lepidagathis, 99  
   \* " storobilina, 96  
 \*Leptaulax, bicolor, 154, 155  
     " dentatus, 155, 157  
     " Nietneri, 155  
     " planus, 155  
     " Timorensis, 155  
 \*Lespedeza decora, 231  
     " elliptica, 231  
     " hirta, 231  
     " parviflora, 231  
   \* " pinetorum, 230  
 \*Limonia alternifolia, 64  
 Limax Carolinensis, 80  
 \*Litsea leiophylla, 103  
 Lonchodes luteoviridis, 45  
     " pseudoporus, 55  
 Lophophanes Humel, 57  
 Lycodon aulicus, 114, 115, 162  
 \*Lysimachia Griffithiana, 86  
   \* " linearifolia, 86  
     " lobelioides, 86  
 \*Machilus fruticosa, 101  
 Macrochlamys honesta, 26  
     " hyalina, 17  
     " hypoleuca, 17  
     " indicus, 18  
     " patane, 17  
     " petasus, 17  
   \*Macrochlamys stephoides, 17  
     " stephus, 17  
 Macroglossus minimus, 204, 205  
 Macrolinus speleæ, 204  
     " latipennis, 155  
     " Weberi, 155  
     " Waterhousei, 156  
 Massa mollissima, 87, 88  
     " muscosa, 87  
     " permollis, 88  
 \*Mangofera caloneura, 66  
     " indica, 66  
 Mastachilus politus, 156, 161  
     " polyphyllus, 156  
 \*Mayodendron, 91  
 Megapodius Nicobaricus, 163  
 Meghimatium striatum, 30  
 \*Melocanna humilis, 251  
 Metabolos, 80  
 Microtropis longifolia, 65  
 \*Microcystis palnicola, 18  
 \*Milletia brandisiana, 69  
     " extensa, 67  
   \* " glaucescens, 67  
   \* " leucantha, 68  
   \* " leiogyna, 67  
   \* " monticola, 67  
     " ovalifolia, 68  
     " pachycarpa, 67  
   \* " pubinara, 68  
     " pulchra, 69  
   \* " tetraptera, 69  
 \*Mocca macrotympa, 166  
 Morinda, 78  
 Mucuna bracteata, 231  
     " pruriens, 232  
 Mundulea pulcra, 69  
 Murina cyclotis, 206  
 Mussenda, 77  
 Nancea, 78  
 Nelsonia, 101  
 Nephrops Norvegicus, 39, 41, 43  
 \*NEPHROPSIS, 40  
 \*Nephropsis Stewarti, 139  
 Neuracanthus, 99  
   \* " grandiflorus, 95  
   \* " subuninervis, 95  
 Noniaphila, 101  
 Nycteridium platyurus, 113  
     " schneideri, 113  
 Nymphon grossipes, 173  
 Oldenlandia, 80  
 Onchidium molle, 38  
 Ophiops microlepis, 144  
 Ophiorrhiza, 79  
 Ophites albofusus, 112, 115, 124  
     " subcinctus, 112, 115, 124  
 Ormosia coarctata, 71  
     " floribunda, 71  
 Oryzalamus longiceps, 112, 114, 120  
 \*Oxytenanthera macrostachya, 251

- Oxytenanthera Thwaitesii*, 152  
*Pachysoma Sherreri*, 201  
*Pæderia*, 80  
 \* „ *calycina*, 74  
*Parnacella reticulata*, 31  
*Parmarion reticulatus*, 31  
 \* *Parkia leiophylla*, 73  
 \* „ *insignis*, 74  
*Parus Britannicus*, 57  
 „ *oemodius*, 57  
*Passalus Nicobaricus*, 158  
*Pelocarcinus Lalandei*, 259  
*Peripia mutilata*, 113  
 „ *Peronii*, 113  
*Peristrophe*, 100  
*Petunga*, 77  
*Phalangium caudatum*, 140, 141  
*Phayloopsis*, 99  
*Phelsuma Andamanense*, 163  
*Philomycus bilineatus*, 36  
 „ *Carolinensis*, 30  
 \* „ *pictus*, 30  
 „ *reticulatus*, 31  
 „ *striatus*, 31  
 „ *dorsalis*, 29, 30  
*Phlegmakanthus*, 100  
*Plectopylis repercussa*, 170  
 \* „ *Shanensis*, 170  
 \* *Pleuraruis brachyphyllus*, 152, 156  
 „ *pilipes*, 153  
*Podophis chalcides*, 112, 113  
*Polyozus*, 76  
*Polypedates maculatus*, 112, 114  
 „ *quadrilineatus*, 112, 114  
*Polyphragmon*, 77  
*Pongamia ovalifolia*, 68  
*Pristidia*, 77  
*Procris gibbosa*, 104  
*Psemmodynastes pictus*, 115  
 „ *pulverulentus*, 115  
 \* *Pseudostachyum compactiflorum*, 252  
 \* „ *Helferi*, 253  
 \* „ *Pailobium*, 78  
*Psychotria*, 75  
*Pterolobium lacerans*, 71  
 „ *microphyllum*, 71  
 \* „ *macropterum*, 71  
*Pteropus amplexicaudatus*, 202, 203  
 „ *Assamensis*, 196  
 „ *edulis*, 197, 198, 199  
 „ *Edwardsii*, 196  
 „ *Leschenaultii*, 202  
 „ *leucocephalus*, 196  
 „ *marginatus*, 200  
 „ *medius*, 195, 195, 198, 199  
 „ *melanotus*, 198  
 „ *minimus*, 205  
 „ *Nicobaricus*, 198, 199, 201  
 „ *pyriformis*, 200  
 „ *rostratus*, 205  
 „ *semitauctus*, 202  
*Pterospermum aceroides*, 62  
*Ptyas hexagonotus*, 114  
 „ *korros*, 114  
*Ptychozoon homalocephalum*, 113  
 \* *Pueraria brachycarpa*, 232, 254  
*Pueraria ferruginea*, 232  
 \* „ *hirsuta*, 254  
 \* „ *stricta*, 254  
*Pupa avanica*, 33  
 „ *flosa*, 33  
 „ *kokeilii*, 32  
 „ *lignicola*, 32, 33  
 „ (*Pupisoma*) *orcella*, 33  
 \* *Pupa (Scopelophila) palmira*, 32  
*Pupisoma lignicola*, 32  
*Pyrenaria diospyricarpa*, 60  
*Python reticulatus*, 115  
*Pyrus granulatus*, 232  
 „ *granulosa*, 232  
 „ *Karenium*, 232  
 \* *Quercus Brandisiana*, 107  
 „ *eumorpha*, 107  
*Rana fusca*, 112, 115  
 „ *gracilis*, 112  
 „ *lyunocharis*, 112  
 „ *lyunocharis*, v. *pulla*, 112, 116  
 „ *plicatella*, 112, 116  
 „ *porosissima*, 117  
 „ *tigrina*, var. *pantherina*, 112  
*Randia*, 77  
*Rhinacanthus*, 100  
*Rhinophidion Nicobaricum*, 168  
 \* *Rhopalorhynchus*, 172  
 \* *Rhopalorhynchus Kröyeri*, 171, 172  
*Rhysota Chevalieri*, 12  
 „ *cynatum*, 11  
 „ *densa*, 12  
 „ *semiglobosa*, 12  
*Riopa albopunctata*, 113  
 „ *lineolata*, 114  
*Rotula anceps*, 14, 15, 20  
 \* „ *bijuga*, 14  
 „ *Indica*, 14  
 „ *serrula*, 20  
 „ *Shipilayi*, 14  
*Rubra*, 75  
*Ruellia*, 99  
 \* *Ruellia flaccida*, 91  
 \* „ *macrostiphon*, 92  
 „ *subfruticosa*, 92  
*Rungia*, 100  
*Saprosma*, 76  
*Sarcocephalus*, 78  
 \* *Sauranja armata*, 59  
 \* „ *macrotricha*, 60  
 \* *Schizostachyum Blumei*, 252  
 \* „ *Hindstanicum*, 252  
*Scleromitron*, 80  
*Scyphiphora*, 76  
*Scyphostachya*, 77  
 \* *Semicyclus Redtenbacheri*, 153

- Serissa*, 76  
*Sesara infrondens*, 24  
*Shorea floribunda*, 60  
     " *Penangianum*, 61  
*Sitala*, attegaia, 13  
 \*   " *carinifera*, 15  
     " *caecumifera*, 20  
     " *infusa*, 13, 20  
     " *tricarinata*, 16  
*Solenocyclus exaratus*, 156  
*Sophora robusta*, 71  
*Spathodea ignea*, 91  
     " *stipulata*, 91  
 \*   " *velutina*, 90  
*Spatholobus crassifolius*, 254  
*Spermocoe*, 80  
*Spiradiclis*, 79  
*Stephegyne*, 78  
*Sterculia ornata*, 228  
     " *villosa*, 228  
*Simotes ancoralis*, 122  
     " *bicatenatus*, 114, 120, 121  
     " *brevicauda*, 122  
 \*   " *catenifer* 114, 121  
     " *Cochinchinensis*, 122  
     " *cruentatus*, 114, 121  
*Stradium angustum*, 233  
 \* *Stemona Griffithiana*, 109  
*Stenogyra gracilis*, 27, 33  
*Stereospermum chelonoides*, 91  
 \*   " *neuranthum*, 91  
*Strobilanthes*, 99  
     " *acrocephalus*, 94  
     " *Borhavioides*, 95  
 \*   " *Burmanica*, 92  
     " *imbricata*, 94  
 \*   " *fetidissima*, 93  
     " *fimbriata*, 93  
 \*   " *glandulosa*, 92  
     " *glomerata*, 94  
     " *Griffithiana*, 93  
 \*   " *dasyperma*, 94  
 \*   " *Karensium*, 96  
 \*   " *Neesii*, 93  
 \*   " *pterocalis*, 93  
     " *pentastemonoides*, 95  
 \*   " *subflaccida*, 94  
*Swietenia velutina*, 65  
     " *vellosa*, 65  
*Symplocos cratageoides*, 89  
 \*   " *leucantha*, 89  
 \*   " *leioetachya*, 89  
     " *lucida*, 89  
 \*   " *pedicellata*, 89  
 \* *Tabernaemontana membranifolia*, 90  
 \*   " *ophiorrhizoides*, 89  
     " *rostrata*, 90  
     " *subcapitata*, 90  
*Tachydromus seelineatus*, 114  
*Tanioceras bicanthatus*, 152  
     " *bicuspis*, 152  
     " *pygmaeus*, 152  
*Tebenophorus Carolinensis*, 29  
*Terminalia clebulosa*, 81  
 \*   " *tomentella*, 80  
 \* *Tetranthera albicans*, 102  
 \* *Tetranthera calophylla*, 102  
 \*   " *nuculanea*, 102  
     " *Panamoja*, 103  
*Thelyphonus Assamensis*, 128, 130, 133  
     " *angustus*, 127, 130, 134  
     " *Antillanus*, 128, 142  
 \*   " *Beddomei*, 129, 130, 142  
     " *Brasilianus*, 128  
     " *caudatus*, 128, 134, 140, 141  
     " *formosus*, 129, 130, 137  
 \*   " *indicus*, 129, 130, 138  
     " *Inganus*, 128 [134, 141, 142  
     " *proscorpio*, 128, 129, 132, 133,  
     " *rufipes*, 128, 129  
     " *rufimanus*, 128, 134  
     " *scabrinus*, 127, 130, 134, 141  
*Thibaudia micrantha*, 84  
     " *variegata*, 84  
*Thunbergia*, 98  
*Tiaris dilophus*, 168  
 \*   " *Humei*, 167  
     " *subcristata*, 163, 167  
     " *tuberculatus*, 168  
*Trachia breviseta*, 25  
     " *crassicostata*, 171  
     " *eustoma*, 25  
     " *erinacea*, 25  
     " *fallaciosa*, 171  
 \*   " *Footei*, 170, 171  
     " *Helferi*, 25  
     " *Nilghirica*, 171  
 \*   " *Penangensis*, 24, 26  
     " *quieta*, 25  
     " *ruginosa*, 171  
*Tragops prasinus*, 114  
*Trimeresurus cantoris*, 162  
     " *erythrusus*, 115  
     " *porphyraceus*, 163  
     " *Wagleri*, 115, 126  
*Trochomorpha castra*, 21, 22  
     " *Cantoriana*, 22  
     " *planorbis*, 20, 22  
     " *Ternatana*, 20, 21  
     " *Timorensis*, 22  
*Tropidonotus quincunciatus*, 114, 162  
     " *trianguligerus*, 114  
     " *vittatus*, 114  
*Typhlops braminus*, 114  
     " *nigroalbus*, 114  
*Typhloscincus Martensii*, 169  
     " *Nicobaricus*, 168  
*Uncaria*, 79  
*Uraria obcordata*, 229  
*Urophyllum*, 78  
 \* *Vaccinium campanulatum*, 85  
 \*   " *exaristatum*, 86  
 \*   " *macrostemon*, 86  
     " *miniatura*, 86

- \**Vaccinium pumilum*, 15
  - " *setigerum*, 84
  - " *variegatum*, 84
  - " *verticillatum*, 83, 84
  - Vaginulus Birmanicus*, 33
  - " *Hasselti*, 33
  - " *Luzonicus*, 34
  - " *porulosus*, 36
  - " *solea*, 34
  - " *Taunaysii*, 36, 37
  - " *Tourannensis*, 34, 35, 36
  - Vangueria*, 76
  - Vellejus Moluccanus*, 155
  - Veronicella Brimania*, 34
  - Veronicella laevis*, 34
  - " *Luzonicus*, 34, 35
  - " *solea*, 34
  - \**Vespertilio murinoides*, 205, 206
  - " *murinus*, 205, 206
  - \**Vitex, canescens*, 101
  - " *Negundus*, 101
  - Vitis Linnei*, 66
  - " *Wallichii*, 66
  - \**Vitrina nucleata*, 23
  - \*WEBER, 77
  - Wendlandia*, 79
  - Xenopeltis unicolor*, 115
  - Zetes hispidus*, 174
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# JOURNAL OF THE ASIATIC SOCIETY.

Part II.—PHYSICAL SCIENCE.

No. I.—1873.

ON DIFFERENTIAL GALVANOMETERS,—  
by LOUIS SCHWENDLER. \*

(Continued from page 152, Vol. XLI, Part II, 1872.)\*

The first part of this investigation concluded with the following question :

*What general condition must be fulfilled in the construction of any differential galvanometer in order to make a simultaneous maximum possible with respect to an alteration of external resistance in either of the differential branches ?*

To answer this question, it will be necessary to remember, that the condition of a simultaneous maximum sensitiveness at or near balance was expressed by 3 equations, namely,—

$$\frac{(w-g)(w'+g')+f(w+w'+g'-g)}{p(g-w)g'} = \frac{2(g+w+f)}{2\sqrt{g}\sqrt{g'}-p(g+w)} \dots \text{II}$$

$$\frac{(w'-g')(w+g)+f(w+w'+g-g')}{\frac{(g'-w')}{p} \cdot g} = \frac{2(g'+w'+f)}{2\sqrt{g}\sqrt{g'}-\frac{g'+w'}{p}} \dots \text{II'}$$

and

$$g' + w' - p \frac{\sqrt{g'}}{\sqrt{g}} (g + w) = 0 \dots \text{I}$$

$g$  and  $g'$  being the resistances of the two differential coils,  $w$  and  $w'$  the two resistances at which balance actually arrives,  $f$  the total resistance in the battery branch, and  $p$  an absolute number expressing what was termed the

\* Read before the Asiatic Society of Bengal, 6th March, 1872.

$$p'' = \frac{w}{w} \dots\dots\dots c.$$

$$C = \frac{w'}{w} \dots\dots\dots d.$$

### Additional remarks.

In the foregoing it has not been shewn that the values  $g$  and  $g'$ , expressed by equations  $a$  and  $b$ , must necessarily correspond to a maximum sensitiveness of the differential galvanometer, because it was clear *a priori*, that the function by which the deflection is expressed is of such a nature that no minimum with respect to  $g$  and  $g'$  is possible. However, to complete the solution mathematically, the following is a very short proof that the values of  $g$  and  $g'$  really do correspond to a maximum sensitiveness of the differential galvanometer under consideration.

Reverting to one of the expressions for the deflection  $a^\circ$  which any differential galvanometer gives before balance is arrived at, we had :

$$a^\circ \propto K \frac{\sqrt{g}}{N} \Delta \text{ and as the increase of deflection at or near balance is}$$

identical with the deflection itself, and further as the law which binds the resistance of the differential coils to the other resistances in the circuit, in order to have a maximum sensitiveness, is of practical interest only when the needle is at, or very nearly at, balance, we can solve the question at once by making  $a^\circ$  a maximum with respect to  $g$  and  $g'$ , if we only suppose  $\Delta$  constant and small enough, and as  $K$  is known to be independent of  $g$  and  $g'$ , the deflection  $a^\circ$  will be a maximum if  $\frac{\sqrt{g}}{N}$  is a maximum for any constant  $\Delta$  (zero included).

Further we know that  $g' = Cg$  which value for  $g'$  in  $N$  substituted will make the latter a function of  $g$  only and consequently  $\frac{\sqrt{g}}{N}$  also. We have therefore to deal with a single maximum or minimum, and according to well-known rules we have :

$$\frac{da}{dg} = \frac{N - 2g \frac{dN}{dg}}{2\sqrt{g} N^2} = \frac{U}{V}$$

and

$$\frac{d^2a}{dg^2} = \frac{V \frac{dU}{dg} - U \frac{dV}{dg}}{V^2}$$

but

$$\frac{da}{dg} = 0 \quad \text{it follows that} \quad U = 0$$

$$\therefore \quad \frac{d^2a}{dg^2} = \frac{1}{V} \frac{dU}{dg}$$

Now

$\frac{dU}{dg} = -\left(\frac{dN}{dg} + 2g \frac{d^2N}{dg^2}\right)$ , but  $\frac{dN}{dg}$  as well as  $\frac{d^2N}{dg^2}$  being invariably positive, it follows that  $\frac{dU}{dg}$  is invariably negative, and as further  $V$  is always positive it follows finally that  $\frac{d^2a}{dg^2}$  is always negative, or the value of  $g$  obtained by equation  $\frac{da}{dg} = 0$  corresponds to a maximum sensitiveness of the differential galvanometer.

In a similar way it can be shewn that the value of  $g'$  obtained by equation  $\frac{da}{dg'} = 0$  corresponds also to a maximum sensitiveness of the differential galvanometer.

This is in fact a second and far more simple solution of the problem. However, it is by no means as general, nor does it adhere as closely to the spirit of analysis as the first more complicated solution.

*Effect of Shunts.*—It is clear that the introduction of shunts cannot alter the general results as given in equations  $a$ ,  $b$ ,  $c$ , and  $d$ , as long as the shunts are used merely for the purpose of carrying off a fixed quantity of current without in themselves having any direct magnetic action on the needle.

However, to avoid misunderstanding, it is well to remember that in the case of shunts being used, the values to be given to  $w$  and  $w'$  in the above equations are *not* those at which balance actually arrives, but those at which balance would arrive if no shunts were used, *i. e.*, the resistance at which balance is established when using shunts must be multiplied by the multiplying power of their respective shunts, before they are to be substituted in the equations  $a$ ,  $b$ ,  $c$  and  $d$ .

*Mechanical arrangement designed by p.*—The condition which must be fulfilled in the construction of any differential galvanometer to make a simultaneous maximum sensitiveness possible was expressed by

$$p^2 = \frac{w'}{w} \dots\dots\dots c.$$

while  $p = \frac{m'n'}{m n}$  and it will be now instructive to enquire what special physical meaning equation  $c$  has.

By  $m$  was understood the magnetic effect of an average convolution (*i. e.* one of average size and mean distance from the magnet acted upon, when the latter is parallel with the plane of the convolutions) in the differential coil of resistance  $g$ , when a current of unit strength passes through it. Similarly  $n'$  was the magnetic effect of an average convolution in the other differential coil of resistance  $g'$ .

Further  $n$  and  $n'$  were quantities expressed by

$$U = n \sqrt{g}$$

and  $U' = n' \sqrt{g'}$

$U$  and  $U'$  being the number of convolutions in the two coils  $g$  and  $g'$  respectively.

Now we will call  $A$  half the cross section of the coil  $g$  (cut through the coil normal to the direction of the convolutions) and which section, as the wire is to be supposed uniformly coiled, must be uniform throughout.

Thus we have generally

$$\frac{A}{c(q + \delta)} = U$$

wherever the normal cut through the coil is taken.

$c$  is a constant indicating the manner of coiling, either by dividing the cross-section  $A$  into squares, hexagons or in any other way, but always supposing that however the coiling of the wire may have been done, it has been done uniformly throughout the coil. (This supposition is quite sufficiently nearly fulfilled in practice because the coiling should always be executed with the greatest possible care, and further the wire can be supposed practically of equal thickness throughout the coil).

$q$  is the metallic section of the wire, and  $\delta$  the non-metallic section due to the necessary insulating covering of the wire.

Further we have

$$g = U \frac{b}{q\lambda} \text{ where } b \text{ is the length of an average convolution and } \lambda \text{ the}$$

absolute conductivity of the wire material supposed to be a constant for the coil.

• Now, for brevity's sake, we will suppose that  $\delta$ , the cross-section of the insulating covering, can be neglected against  $q$  the metallic cross-section of the wire.

Consequently we have

$$\frac{A}{cq} = U \text{ (approximately)}$$

$$\text{and } g = U \frac{b}{q\lambda}$$

$$\therefore U = \sqrt{\frac{A\lambda}{bc}} \cdot \sqrt{g}$$

$$\begin{aligned} \text{or} \quad n &= \sqrt{\frac{A\lambda}{bc}} \\ \text{similarly} \quad n' &= \sqrt{\frac{A'\lambda'}{b'c'}} \\ \therefore \frac{n'}{n} &= \sqrt{\frac{A'\lambda'bc}{A\lambda b'c'}} \end{aligned}$$

But using wire of the same conductivity in both the differential coils, which should be as high as is possible to procure it, and further supposing the manner of coiling to be identical in both coils, we have

$$\lambda = \lambda'$$

$$\therefore \frac{n'}{n} = \sqrt{\frac{A' \cdot b}{A \cdot b'}}$$

Further we know that if the shape and dimensions of each coil are given, and in addition also their distance from the magnet acted upon, it will be always possible to calculate  $m$  and  $m'$ , though it may often present mathematical difficulties, especially if the forms of the two coils differ from each other and are also not circular. This latter condition is generally necessitated in order to obtain the greatest absolute magnetic action of each coil in as small a space as possible.

However it is clear that we may assume generally that the two coils have each an average convolution of identical shape and of the same length, placed at an equal distance from the magnet acted upon, and that therefore the magnetic action of each coil is dependent on the number of convolutions only.

In this case we have evidently

$$\begin{aligned} m &= m' \\ b &= b' \end{aligned}$$

$$\frac{n'}{n} = \sqrt{\frac{A'}{A}}$$

$$\text{and as } p = \frac{n}{n'} \cdot \frac{m'}{m}$$

we have finally

$$\frac{A'}{A} = \frac{w'}{w} \dots\dots\dots e.$$

Equation *e* shows at once that under the supposed conditions, *i. e.*, when the average convolutions in each coil are of equal size and shape, the wire used in either coil is of the same absolute conductivity, and that the thickness of the insulating material can be neglected against the diameter of the wire:

*The wire used for filling each coil must be invariably of the same diameter, otherwise a maximum sensitiveness is impossible.*

How the above simple law expressed by equation *e* would be altered, when the given suppositions were not fulfilled, must be found by further calculation, but as the latter is intricate and a more general result is not required in practice, I shall dispense at present with this labour.

*Special Differential Galvanometers.*—Here shall be given the special expressions to which the general equations *a*, *b*, *c* and *d*, are reduced when certain conditions are presupposed.

*1st case.*—When *w* and *w'*, the two resistances at which balance is arrived at are so large that *f*, the resistance of the testing battery can be neglected against either of them without perceptible error. Substituting therefore *f* = 0 in equations *a*, and *b*, we get :

$$g = \frac{w}{3} \dots\dots\dots a.$$

$$g' = \frac{w'}{3} \dots\dots\dots b.$$

and the other two remain as they are namely :

$$p^2 = \frac{w'}{w} \dots\dots\dots c.$$

$$C = \frac{w'}{w} \dots\dots\dots d.$$

*2nd case.*—When the battery resistance *f* cannot be neglected against either *w* or *w'*, but when the two resistances at which balance is arrived at are invariably equal.

Thus substituting in the general equation

$$w = w' = w$$

we get

$$g = g' = g = -\frac{w+f}{3} + \frac{1}{3}\sqrt{4w^2 + 8fw + f^2} \dots\dots\dots a, b.$$

$$p^2 = 1 \dots\dots\dots c.$$

$$C = 1 \dots\dots\dots d.$$

*3rd Case.*—When the conditions given under 1 and 2 are both fulfilled

or  $w = w' = w$

and  $f = 0$

then we have

$$g = g' = g = \frac{w}{3} \dots\dots\dots a, b.$$

$$p^2 = 1 \dots\dots\dots c.$$

$$C = 1 \dots\dots\dots d.$$

The very same result which was obtained by direct reasoning at the beginning of this paper.

*Applications.*—Though the problem in its generality has now been entirely solved, it will not perhaps be considered irrelevant to add here some applications.

For our purpose differential galvanometers may be conveniently divided into two classes, *viz.*, those in which the resistances to be measured vary within narrow limits, and those where these limits are extremely wide.

To the first class belong the differential galvanometers which are used for indicating temperature by the variation of the resistance of a metallic wire, exposed to the temperature to be measured. As for instance, C. W. Siemen's Resistance Thermometer for measuring comparatively low temperatures, or his Electric Pyrometer for measuring the high temperature in furnaces.

It is clear that for such instruments the law of maximum sensitiveness should best be fulfilled for the average resistance to be measured, which average resistance under given circumstances is always known.

To the second class belong those differential galvanometers which are used for testing Telegraph lines, at present the most important application of these instruments. In this case each differential coil should consist of separate coils connected with a commutator in such a manner that it is convenient to alter the resistance of each coil according to circumstances, *i. e.*, connecting all the separate coils in each differential coil parallel, when the resistances to be measured are comparatively low, and all the separate coils consecutively, if the resistances to be measured are high, &c., &c., fulfilling in each case the law of maximum sensitiveness for certain resistances, which are to be determined under different circumstances differently, but always bearing in mind that it is more desirable to fulfil the law of maximum sensitiveness for high resistances, when the testing current in itself is obviously weak, than for the low resistances.

An example will shew this clearer. Say for instance a differential galvanometer has to be constructed for measuring resistances between 1 and 10,000. A Siemen's comparison box of the usual kind ( $\frac{1}{10,000}$ ) being at disposal, it will be convenient and practical to decide that the two differential coils should be of equal magnetic momentum, from which it follows that  $C$  as well as  $p$  must be unity, or in other words that the two coils must be of equal size, shape and distance from the needle, and must also have equal resistances, *i. e.*, must be filled with copper wire of the same diameter. The resistance of each coil is then found by

$$g = -\frac{w+f}{3} + \frac{1}{3} \sqrt{\frac{1}{3} w^2 + 8fw + f^2}$$

where  $f$  is the resistance of the battery and  $w$  a certain value between

1 and 10,000, the two limits of measurement. The question now remains to determine  $w$ .

It is clear that the law of maximum sensitiveness has not to be fulfilled for either limit, because they represent only one of the 10,000 different resistances which have to be measured, but it is also clear that to fulfil the law for the average of the two given limits would be equally wrong, inasmuch as the maximum sensitiveness is far more required towards the highest than the lowest limit. We may assume, therefore, that it is desirable to fulfil the law for the average of the average and the highest limit, which gives

$$w = 7500$$

against which the resistance of the battery may always be neglected.

Consequently we have

$$g = \frac{w}{3} = 2500$$

for each coil.

Now if the coil be small, and consequently the wire to be used for filling it is thin, the value  $g = 2500$  wants a correction to make allowance for the thickness of the insulating material, by which  $g$  becomes somewhat smaller.\*

Before concluding I may remark that the question of the best resistance of the coil, when the resistance to be measured varies between two fixed or variable limits, can be solved mathematically by the application of the Variation Calculus.

\* These expressions for  $g$  and  $g'$  must be corrected, if the thickness of the insulating covering of the wire cannot be neglected against its diameter. The formula by which this correction can be made was given by me in the Philosophical Magazine, January, 1866, namely

$$\text{corrected } g = c g \left( 1 - 4 \sqrt{g m^2} \right)$$

where  $g$  = the resistance to be corrected and expressed in Siemen's Units,

$$\text{and } m = \delta^4 \sqrt{\frac{c \pi \lambda}{AB}}$$

$\delta$  = radial thickness of the insulating covering expressed in millimetres.

•  $c$  = a co-efficient expressing the arrangement adopted for filling the available space uniformly with wire. Namely, if we suppose that the cross section of the coil, by filling it up with wire, is divided into squares we have  $c = 4$ , if in hexagons  $c = 3.4$ , &c., &c.

$\lambda$  = absolute conductivity of the wire material ( $Hg = 1$  at freezing point).

$A$  = half the section of the coil in question when cut normal to the direction of the convolutions, and always expressed in square millimetres.

$B$  = length of an average convolution in the coil, and expressed in metres.





ON THE LAND-SHELLS OF PENANG ISLAND, WITH DESCRIPTIONS OF THE  
ANIMALS AND ANATOMICAL NOTES ; *part second*,\* *HELICACEA*,—  
by DR. F. STOLICZKA.

[Read and received 7th August, 1872.]

(With plates I to III.)

In this group of pulmoniferous land-shells I shall notice twenty three species, belonging to the *Zonitidæ*, *Helicidæ*, *Bulimidæ*, *Clausilidæ*, *Philomycidæ*, *Pupidæ*, *Streptaxidæ*, *Veronicellidæ* and *Vaginulidæ*. The majority of the species are new, except a few previously described from the neighbouring country, and on one or two of such commonly distributed species, as are *Stenogyra gracilis* or *Ennea bicolor*.

Nearly all the species had been collected with the animals living, and I have spared no pains in order to make the detailed anatomical account as complete, as it appears desirable for a correct generic determination.

I scarcely need to mention, that on the whole the fauna is characteristically Malayan, the same fauna which extends from the Philippine islands through Burma and Arakan into the warm valleys of Sikkim. In the plains of Bengal it mixes with the Indian fauna proper.

I cannot help repeating the urgent request to my conchological friends in India, that they may favour me with live specimens of the species of shells occurring in their neighbourhood. In the *Helicaceæ* especially, the anatomical characters are indispensable for a correct generic determination, and without this it will not be possible to obtain a natural arrangement of our terrestrial Mollusca.

*Fam. Zonitidæ.*

*RHYSOTA*† *CYMATIUM*, (*Benson*). Pl. i, figs. 1-3 and pl. ii, figs. 13-15.

*Helix Cymatium*, Benson, apud Pfeiffer, Novit. Conch. I, p. 58, pl. xvii, figs. 1-2.

Penang specimens, which slightly differ in the height of the spire, (see figs. 1-3, pl. i.) agree in almost every point of structure with the type shell, described by Pfeiffer from Lancavi, a small island situated a few miles north of Penang. The increase of the volutions is in both exactly the same, the upper side of the whorls is marked with fine oblique rugosities, the lower is spirally striated; in fresh specimens the former is silky brown, the lower olivaceous brown, the inside of the aperture is in full grown specimens cover-

\* Continued from J. A. S. B., for 1872. Vol. XLI, pt. ii, p. 271.

† Albers, *Heliceen*, edit. E. v. Martens, p. 54.

ed with a kind of a nacreous callose layer. The only noticeable difference consists in the narrowness of the umbilicus, its width being in all the Penang specimens, which I obtained, about one twelfth of the diameter of the shell, while in Benson's type it is only one seventh of the same diameter.

The species is found all over Penang hill from elevations of about 300 to 2500 feet, and both on the ground as well as on trees, but chiefly on the latter; it is, however, not common, and adult shells are indeed extreme rarities.

The closely allied *Rh. densa*, (Adams),\* only differs by a slightly smaller number of whorls, the last being much wider. *Rh. Chevalieri*, (Souleyet), differs in the same character, though it has the umbilicus of exactly the same size as the Penang variety of *cymatium*.

The animal is stout and rather short, its total length being less than twice the diameter of the shell; the posterior part of the body is the shorter one, and above rather sharply ridged; it ends with a large gland and a projecting horn above it. The whole body is uniform more or less dark brown, laterally strongly warty and obliquely grooved; the pedal row is very distinctly margined on both sides with an impressed line, and the margin of the foot below it is broad, smooth, marked with alternately brown and pale oblique stripes, so as to give the appearance of a variegated fringe. The eye peduncles and tentacles are of usual proportionate length, dark brown or even blackish, the latter with pale tips. On the whole, the general colour of the specimens varies a great deal; the young are mostly pale brown with an olivaceous tinge, while in old ones the neck, including the head and pedicles, become almost black.

The mantle is somewhat paler than the body, its edge moderately thickened. There are two small linguiform shell-lobes present, a right one, just below the inner or posterior angle of the aperture of the shell, thus playing on the inner lip, and producing its moderately distinct nacreous and callose structure. The other lobe lies below the outer periphery of the shell on the basal side; it projects from the outer end of a rather elongated very narrow fringe, which is separated from the edge of the mantle itself. The right neck-lobe is entire, thick, rounded, somewhat freely projecting at the lower or umbilical end. The left neck lobe is divided in two portions, the upper elongately rounded, the lower much narrower, with the upper end somewhat pointedly extended. The edge of the mantle which secretes the umbilical margin of the peristome is internally considerably thickened, (comp. pl. ii, fig. 13).

I have not been able to see satisfactorily the exact structure of the genital system, but, as far as it could be examined, it appears almost entirely to agree with that of *Rhysota semiglobosa*, figured by Semper. There certainly are no appendages present—neither on the penis, nor on the seminal duct or uterus.

\* E. v. Martens, Ost-Asiat. Expedit. p. 230, pl. 10, fig. 1.

The jaw is smooth, semilunar, with a round projection in the middle of the concave edge; it is about 2.5 m.m. broad.

The radula is comparatively of very great length. In a middle-sized specimen it measured 7 m.m. in length and 3 m.m. in breadth, although one of the ends was not quite perfect. I counted 106 transverse rows and about 141 teeth in each row. The centre tooth has a comparatively short point without any lateral denticles, and is somewhat smaller than the adjoining laterals. The first of these has a long, laterally bent, rather blunt projection; the following very gradually decrease in size and the middle cusp becomes gradually more pointed and curved, while the basal plate decreases. With about the fiftieth tooth the end begins to become bicuspid, and on about the hundredth tooth on either side, the two cusps are sharpest and best developed.

Semper (Reisen in Archipel der Philipp., Vol. III, p. 68) says that *Rhysota* does not possess any developed shell lobes of the mantle. In the present species their existence is undeniable, and still all the other characters of the animal and shell point towards the greatest relation of *R. cymatium* to other typical species of the genus, which scarcely would have any meaning, if it were restricted in the sense given to it by Semper. I very much doubt, that all the species with polished lower surface of the shell, referred by Semper to *Rhysota*, have no shell-lobes. How then do they produce the smoothness of the shell? I generally found shell-lobes essential for that purpose. But supposing some of the species really had no shell-lobes, this would be no sufficient reason for excluding any other species which possess them from *Rhysota*; for in *Xesta* we have a similar mixture of forms with and without shell-lobes.

Thus the only anatomical difference, which remains to be considered as distinguishing *Rhysota* from *Xesta*, is the simple form of the genital organs in the former. How far this character is really reliable for generic distinctions, is a point by no means easily settled, as I had already occasion to notice when speaking of the anatomy of the two species of *Sitala* (*Conulema*, olim) (Journ. A. S. B., Vol. xl, Pt. ii, 1871, p. 236 &c.), *S. atlegia* and *S. infula*.

When we compare the characters relating to the presence or absence or form of the mantle lobes, we meet with a perfect similarity between *Rhysota* and *Rotula*. The distinction between the two merely rests in the presence of an amatorial gland in the latter genus, while the shells only differ in the upper side of *Rhysota* being irregularly corrugated, and in *Rotula* reticulately striated, or transversely costulated.

In speaking of the shell of *Rhysota*, Albers gives the peculiarly rugose upper surface as one of the most important characters of the genus.

*ROTULA*\* *BIJUGA*, n. sp., Pl. i, figs. 4-7 and pl. ii, figs. 16-18.

*R. depressa* conoidea et suborbiculata, vel late conica, angustissime umbilicata, tenui, cornea, pallide succinea; anfractibus 5·5 ad 6·5, suturâ simplici, suprâ rare filiforme marginata, junctis, lente accrescentibus, in superficie superiore convexiusculis, costulis transversis obliquis, confertis, striis spiralibus confertissimis ac plus minusve distinctis intersectis, crispatulis seu subgranulosis, ornatis; ultimo ad peripheriam acute carinato, ad basin modice inflato, nitido, sublævigato, striis incrementi radiantibus atque alteris spiralibus sub-obsoletis notato, medio concaviusculo; apertura angulatim semilunari, paulum obliqua, labio tenuissimo vix distinguendo, labro ad marginem tenui, neque expanso, neque incrassato, ad insertionem umbilicalem brevissime reflexo instructa.

Dimensiones varietatum frequentium:—

| am. major. | D. minor. | Alt. testas. | Alt. aperturæ. | Lat. aperturæ. |
|------------|-----------|--------------|----------------|----------------|
| a. 14·5    | 13·5      | 11·0         | 6·0            | 7·6 m.m.       |
| b. 16·2    | 15·0      | 10·9         | 6·6            | 8·2 "          |
| c. 17·4    | 15·6      | 12·0         | 7·2            | 9·2 "          |
| d. 17·4    | 16·0      | 10·9         | 7·0            | 9·0 ..         |

Diam. maj. speciminis maximi 18·8 m.m.

It will be seen from the above measurements, which are taken from the four figured specimens, that the height of the shell is very variable, but the increase of the whorls is very nearly quite constant. The upper convexity of the whorls also slightly varies; the sides of the spire are generally nearly straight, more rarely conspicuously convex; occasionally the peripheral keel is somewhat projecting above the suture. The ornamentation is characteristically that of *Rotula*, reticulately sculptured above, nearly smooth below. The transverse ribs on the upper surface are traversed by fine spiral lines, which generally only produce a slight undulation in the direction of the ribs, sometimes, however, a fine granulation is formed. As regards form, the present species very closely resembles the Burmese *R. anceps*, (Gould), and also the South Indian *R. Shiplayi*, the first has, however, the upper costulation very fine and no spiral striæ, while the latter has both much stronger developed, producing a granular surface, and the shell is also more solid. The third very closely allied species is *R. indica*, differing principally by a greater width of the last whorl, and also by a stronger sculpture.

\* Comp. Journ. A. S. B., 1871, Vol. xl, pt. ii, p. 231. The name *Rotula* has also been applied in the ACTINOZOA, but if our zoological classification should make such rapid progress, as it has done lately, it will, I think, in no long time be almost impossible to find new names for the generic groups, and we shall be forced to modify the existing rules at least so far that the same name may become reapplicable in at least the five or six principal divisions of the animal kingdom. A further relaxation of the rule would scarcely prove beneficial and would hardly be necessary.

The animal of the Penang species, when fully extended, equals in length about twice the longer diameter of the shell ; back roundly flattened above, foot posteriorly obtusely ridged, terminating with a large gland which is superseded by a small horn ; pedal row very distinct and the edge of foot below obliquely striated. The general colour of the body is pale or livid grey, with a general reddish tinge when full grown. A pale yellow (in young), or more or less distinctly cinober red (in adults), stripe extends along the centre of the back and the superior ridge of the foot, the former is bounded on each side by a broad black stripe, originating at the base of each peduncle and continuing to the mantle, and below this stripe there is again a yellowish or red line. The posterior red band is only edged with black. The sides of the foot, both anteriorly and posteriorly, are more or less distinctly variegated with impure black and tinged with red ; front of head between the two pedicles and tentacles with a black spot ; pedicles and tentacles generally greyish, the latter with a reddish tinge, and with pale, rather large, globular tips, the former with a black ring at the base where the longitudinal black bands begin.

The mantle is moderately thickened. The right shell lobe is entirely obsolete, or only indicated by a very slight extension of the edge, a short distance below the upper angle of the aperture of the shell. Sole of foot divided by a longitudinal groove. The right neck lobe is large and extends as a moderately broad fringe to near the retractor muscle where it terminates with a free end. The left neck lobe is smaller with a linguiform free outer end. The left outer edge of the mantle is externally also entire, like the right one, but about the middle of the basal portion it has internally a distinct lobe, about 2 m.m. in length, which in its situation strictly speaking lies between the shell and the neck lobe ; but as it becomes reflected with its edge over the shell, it has to be regarded as the representant of the left shell lobe. The lower portion of the left neck lobe is only a thickened swelling, extending as a narrow inner rim of the edge of the mantle to near the umbilicus. Both the right and left neck lobe have a large black spot, in continuation of the lateral black bands of the back.

The general anatomy does not differ in any essential point from that of *R. anceps*, as briefly noticed by me in Journ. A. S. B., Vol. xl, pt. II, 1871, p. 233, pl. xvii, fig. 1.

The jaw is semilunar, perfectly smooth, with obtusely rounded corners, and a slight rounded projection in the centre of the concave edge ; it is about 1.5 m.m. broad.

The length of the radula is about 4.5, and its breadth above 1.5 m.m. ; it is composed of about 105 transverse, nearly straight rows of teeth, there being about 121 teeth in each row. The form of the teeth again very closely resembles that of *Rot. anceps*, (loc. cit.). All the points extend beyond the upper edge of the basal plate ; the central is somewhat widened below

the terminal point, contracted in the middle, but it has no distinct denticles at the sides. The laterals gradually become more and more turned, and curved, with a small inner and scarcely a trace of an outer denticle; up to the 20th they very gradually diminish in size, then a very slight break follows, the 21st being somewhat sensibly smaller and first distinctly bicuspid at the tip, while at the same time the size of the basal plate has much diminished, until in the last teeth it almost entirely becomes obsolete; the two terminal cusps on the other hand become gradually more and more equal.

The genital organs have a distinct amatorial gland, possessing near its origin a large globose appendage, internally composed of an elliptical largely cellular mass, in which the cells are concentrically arranged with their longer diameter perpendicular to the walls of the ellipse. The posterior part of the gland is filled with a finely granular substance,—probably calcareous particles. The vas deferens has only one slight enlargement about the middle of its length; it consisted in a simple thickening of the walls, but I could not trace any calcareous particles in it. Towards the end, where the penis is lodged, the tube is widest and somewhat curved, but there are no other appendages, or calcareous sacs accompanied with a flagellum, present, such as have been observed in many other species of *Rotula*.

*SITALA*\* *CARINIFERA*, n. sp. Pl. i, fig. 8.

Testa globose conoidea, cornea, apice obtusula, angustissime perforata; anfractibus quinque, gradatim accrescentibus, convexe angulatis, sutura simplici junctis, transversim minutissime striolatis, superis infra medium carinis filiformibus duobus ornatis, ultimo ad peripheriam tricarinato, basi planate convexiusculo, lævigato; apertura semilunari, verticali, non descendente, labro extus tenuissimo, in regione columellari paululum reflexiusculo.

Diam. maj. 2·2, minor 2; alt. testæ 2 m. m.

*Hab.*—‘Penang hill,’ in foliis *Coffea arabicæ*, specimen unicum.

The animal of this species is exactly like that of *S. infula*, figured in pl. xviii, in J. A. S. B., Vol. xl, Pl. ii, for 1871; it has a generally pale brownish grey colour; but having obtained a single specimen, I did not like to sacrifice the shell, in order to notice the internal structure; for when examining these little species one is by no means sure, that he will obtain from a single specimen an insight into the whole anatomy.

The present species is closely allied to the Nilgheri *Helix tricarinata*. Blf., which is also a *Sitala*, and differs by a more depressed and broadly conical shape, and by having a much wider umbilicus.

\* H. Adams proposed this name for *Helix infula*, Bens., as type (P. Z. S. for 1865, p 408) I had unfortunately overlooked this reference, when I proposed for Benson's *ottegia* (and *infula* and a few others) the name *Conulema*, which must now be regarded as identical with *sitala* (J. A. S. B., xl, pt. II, p. 236.)

*MACROCHILAMYS*\* *STEPHOIDES*, n. sp. Pl. i, fig. 9, and pl. ii, figs. 19-20.

*M. orbiculata*, spira depresso convexiuscula, basi medio concaviuscula, angustissime perforata, tenui, succineo cornea, unicolore, circa umbilicum albescente; anfractibus sex, lentissime accrescentibus, sutura lineari junctis, infra suturam angustissime adpressis, nitidis, fere politis, striis incrementi transversis minutissimis, nonnunquam fere omnino obsoletis, notatis, supra convexiusculis; ultimo ad peripheriam fere uniforme convexo; apertura subsemilunari, vix obliqua, labio per-tenui, labro simplici, ad basin paulum sinuose producto, ad insertionem umbilicalem anguste atque breviter reflexo. Diam. maj. 11·6, d. min. 10·7, alt. 7; alt. apert. cum perist. 4·8, ejusdem lat. 5·6 m.m.

The nearest ally of this species, as regards general character and size, is the Andamanese *Macroch. stephus*,† (Benson), differing from the present species by a somewhat more depressed form and by having the sides of the spire nearly straight or slightly concave, but not convex. *Macroch. hyalina*,‡ Martens, is also very closely allied, it is a larger shell and with a more rapid increase of the volutions, the difference between the smaller and larger diameters being 2·5 m.m. In Burma and Sikkim several other allied forms occur, such as *M. hypoleuca*, *palane*, *petasus*, &c., but they are all smaller and more depressed shells.

The species is rare; I found a single live specimen and half a dozen of old shells at the base of Penang hill, about 300 feet.

The animal is long and very slender, blackish grey above and on the pedicles, paler at the sides of the foot, which has a long and thin horn above the tail gland. Both shell and neck lobes are well developed, the right ones larger than the respective left ones. The two shell lobes are linguiform, and the right one, when fully expanded, covers almost half of the upper surface of the shell. The lower portion of the left neck-lobe is merely represented by a slightly thickened rim, extending from the place of insertion of the left shell-lobe to near the umbilicus.

The jaw is one mill. broad, with a central rounded tooth in the concave edge and with the corners somewhat bent outwardly; a form which is also met with in several other species of *Macrochlamys*.

The radula has not been seen perfect, but it does not appear to have been more than four mill. long, and there appear to have been at least 101 teeth in each transverse row; all with very sharp points; the central with

\* Comp. Journ. A. S. B., vol. xl, pt. ii, 1871, p. 246.

† The figure of this species in Conch. Ind., pl. 62, is taken from a young or imperfect specimen, in which the peculiarly depressed form is not so well discernable as in an adult shell. Fig. 6 on the same plate is incorrect, because it does not shew the sinuously produced median basal portion of the peristome.

‡ Preuss. Exped. nach Ost Asien, II, p. 241, pl. 12, fig. 5.

a distinct denticle on either side, and the last laterals with two small unequal cusps; all have the basal plate obtusely narrowed outwardly.

The genital organs are very similar to those of *M. indicus*, Benson, but much more slender; the amatorial gland is very thin (in a young specimen), there is a small cœcal appendage on the vas deferens, and a flagellum at the base of the penis, just before a swelling filled with calcareous particles.

*MICROCYSTIS*\* *PALMICOLA*, n. sp. Pl. i. fig. 10.

*M. testa* late conica, tenui, cornea, angustissime umbilicata; anfractibus quinque, gradatim accrescentibus, convexiusculis, sutura simplici junctis, supra splendore albide sericino, transversim oblique, minutissime atque confertissime, striolatis, ultimo ad peripheriam acute angulato; basi convexiuscula, olivaceo nitita; apertura subsemilunari, extus angulata, obliqua; labro tenui, simplici, ad basin recedente, ad umbilicum reflexo; labio tenuissimo, vix distinguendo. Speciminis maximi diam. maj. 2·8, d. minor 2·6, alt. 2·2, diam. apert. 1·7, ejusd. alt. 0·95 m.m.

*Hab.*—Penang, sub corticem *Cocco*s *nucifera*, haud frequens.

The shell is distinguished from allied species by its comparatively sharply angular last whorl, slightly inflated base and by the peculiar silky and very finely striated upper surface.

The animal when fully extended equals in length about four diameters of the shell; it is rather dark brownish grey, darkest on the tentacles and on the rostrum; posterior gland superseded by a small horn.

*HELICARION*† *PERMOLLE*, n. sp. Pl. i, fig. 11 and pl. ii, figs. 21-23.

*H. testa* depresso inflatæque conoidea, tenuissima, fere membranacea, translucens, pallide lutescens, vix perforata, spira ultimo anfractu multo brevior; anfractibus 4·5, rapide accrescentibus, ad suturam simplicem adpressis, nitidis, convexiusculis, ultimo inflato, ad peripheriam rotundato, transversim lente arcuateque striatulo, ad basin striis spiralibus sub-obsoletis notato; apertura lunari, valde obliqua, labio albescente, minutissime punctulato, labro tenuissimo, simplici, ad basin valde recedente, ad marginem interiorem umbilici breviter reflexiusculo. Diam. maj. 8·4, d. min. 7·4, alt. 6·3; alt. apert. cum perist. 4, ejusd. lat. 4·3 m.m.

The rather strongly elevated spire, and the membranaceous and transparent structure of the shell, separate this species from the numerous allied forms of the Philippines. The species is rare; I only obtained about half a dozen specimens on low bushes or between old vegetable matter on the ground, about 500 feet above the sea, on Penang hill.

\* *Microcystis*, Beck. Comp. Semper in Reis. Arch. Philipp., pt. II, vol. iii, 1870, p. 43, and Stoliczka in J. A. S. B., vol. xl, pt. II, p. 261.

† Semper, Reisen Archip. der Philippinen, vol. iii, p. 20.



The animal is slender and very long; when fresh the extended foot is three times the longer diameter of the shell, which is then entirely covered by the mantle; but in captivity the shell lobes shrink very rapidly, being reduced to narrow linguiform appendages. Middle of back and of the hind foot whitish or very pale brownish, with a slight pinkish tinge; a broad blackish band runs from each pedicle along the sides of the whole back, and also on the sides of the posterior part of the foot, as far as the terminal gland, which is superseded by a very distinct pointed horn; the dark colour extends down to the pedal row, while a large black spot about the middle of the foot on each side reaches down to the sole; pedicles long, grey; tentacles short and almost white; mantle blackish with small whitish dots. All the four mantle lobes are well developed, the left shell and neck lobes are proportionately somewhat larger than the corresponding right ones, and each of the former has a deep but narrow incision in its lower portion.

The jaw is about one mill. broad, quadrant shaped, smooth, without any projection in the centre of the concave edge, like in most other species of the genus.

The radula is moderately broad and nearly 2.5 m.m. long; there are 95 transverse rows and about 121 teeth in each row, all remarkably small and from the tenth tooth they somewhat rapidly decrease in size towards the edges. The centre tooth has two distinct denticles on either side and a third much smaller one nearer to the base; the principal cusp is pointed. On the subsequent teeth the inner denticles disappear first, and gradually altogether, then the lower outer, while the upper outer remains, until at last it equals the principal cusp, so that the outermost teeth become almost regularly, though shortly, bicuspid.

The general anatomy does not offer any peculiarity requiring special notice. The nervous and digestive apparatus agrees with that of other ZONITIDÆ, except perhaps that the liver is enormously largely developed. The female portion of the genital system has a long sub-pedunculate receptaculum seminis, branching off at its origin. The vas deferens is very short, passing into a rather widened tube, again somewhat contracted near the base of the penis, which is attached by a special strong muscle. The end of the penis widens very rapidly for a short distance before it joins the hermaphrodite opening. I have not observed, in two specimens examined, any cæcal or calciferous appendages.

Genus. *TROCHOMORPHA*, *Albers.*

HELICEN, Edit. E. v. Martens, p. 60, and Preussische Exped. nach Ost Asien vol. ii, Landschnecken, 1867, p. 246; *Nigritella* and *Videna*, ibidem. *Sivella*, Blanf.

The type of this genus is *Helix trochiformis*, Fér., which is characterised by a moderately solid, sub-discoid or depressedly conical shell, the whorls being flattened above, the last carinate at the periphery, the aperture rhombiform or narrowly semilunar with simple sharp edges, but the columellar lips occasionally internally somewhat thickened and slightly reflexed.

I do not know whether the animal of this typical species had been examined, but I have observed those of about a dozen different species, which evidently belong to the same type, and I find that all of them possess a very fine glandular slit at the upper end of the foot, the pedal row being in all also, distinct; they have, therefore, to be referred to the ZONITIDÆ, as already noticed in my paper on the Moulmain shells in Jour. A. S. B., vol. xl, pt. 11, 1871, p. 225.

Judging from a somewhat more intimate examination of the animals of a few species, the following characters have to be added to those derived from the peculiar shape of the shell.

Animal moderately slender, with the posterior part of the foot shorter than the anterior, the former terminating above with a small glandular slit; pedal row distinct; mantle with elongated narrow neck lobes, but with the shell lobes entirely wanting, left neck lobe sometimes divided or insinuated in the middle; jaw smooth; genital organs without amatorial gland, or any other appendages; seminal receptacle and seminal duct very long.

The *Trochomorpha* live on the ground generally in decaying vegetable matter, under or on old wood. Three species have been found on Penang.

Albers, while noticing several typical species, such as *T. planorbis*, Less., under his genus *Discus*, referred to *Trochomorpha* a most varied mixture of shells: for instance; *anceps*, Gould, *serrula*, Bens. etc. which belong to *Rotula*; *Barrackpoorensis*, Pfr., is a *Kaliella*; *cacuminifera* and *infula*, Bens. are *Sitalæ* (= *Conulema*, olim); *H. capitium*, Bens., does not belong to the present family, but to the next, the true *Helicidæ*, etc.

E. v. Martens (l. cit. pp. 246 and 247) adopted two groups in the genus *Trochomorpha*; the one, for which he proposes the name *Nigritella*, includes the obtusely conoid and more solid shells, sometimes with a somewhat obtuse periphery; these are true *Trochomorpha*, of the type of *H. trochiformis*, or of *Troch. Ternatana*, Guillou; the name *Nigritella* is, therefore, entirely superfluous. The second group is classed by Martens as *Videna*, Adams; it includes the more planorboid and sharply keeled species of the type of *H. planorbis*, Less. For this same group, (type *H. castra*, Benson,) W. T. Blanford proposed the subgeneric name *Sivella*.

Judging from the similarity of the shells of these two groups and from what we know of the animal of *T. Ternatana*, observed by Martens, I very much doubt that any necessity exists for subdividing the genus *Trochomorphia*.

*TROCHOMORPHA CASTRA*, (*Benson*). Pl. i, figs. 14-16 and pl. ii, figs. 7-9. *Helix castra*, Benson, Ann. and Mag. Nat. Hist., 1852, vol. x, p. 349.—Recco, Conch. Icon., Helix, No. 1160.

The shell is subject to a very considerable amount of variation as regards the elevation of the spire. Young specimens are sometimes almost planorbular, and in some adults the total height of the shell is scarcely more than one-third of the larger diameter, while in others it somewhat exceeds one half of the same dimension. The width of the umbilicus varies from 0.2 to 0.3 of the diameter of the shell. The base is always distinctly spirally striated, but on the upper side the oblique transverse striae of growth prevail. The usual colour is pale horny, sometimes brown with a pale band below the suture.

The species is very rare on Penang hill, but it is common in Pegu, Arakan, Assam, Sikkim, and within the last few years it became abundant in the botanic garden near Calcutta, having been most likely introduced from Darjeeling. One of the largest Sikkim specimens in my collection measures: larger diam. 13, smaller diam. 12, height of shell 7, same of apert. 3, width of same 5.4 m.m.

The animal changes from dark leaden to blackish grey, being always paler at the sides of the foot, generally tinged with brownish below the pedal row; tentacles and pedicles mostly somewhat darker than the body; neck distinctly warty; sole dark grey, entire, without any distinct furrows; tail gland represented by a fine slit about one mill. long. The total length of the foot generally equals one and a half diameters of the shell, the caudal portion being always shorter than the anterior one. The mantle is blackish and in its extent above the large pulmonary cavity variegated with pale spots.

The jaw is smooth, very thin, almost semicircular, with broad oblique ends and a small, in younger specimens sometimes almost obsolete, projection in the centre of the concave edge; its width is about one half millimetre.

The radula is narrow, about two mill. long, or slightly longer, composed of about 85 transverse straight rows, there being about 101 teeth in each of them. All have very sharp, long and pointed cusps, the central with a small denticle on either side near the tip; on the outer ones, as they turn laterally and gradually decrease in size, the inner denticle disappears, while the outer increases, until on the last 15 or 20 teeth, preceding the 3 or 4 terminal ones, it equals the principal cusp. The last few teeth are short, broad, and their outer cusp becomes almost entirely obsolete, the teeth presenting merely an oblique sharp edge.

The female portion of the genital organs has a globular swelling near its origin at the hermaphrodite opening, and the receptaculum seminis

branches off above this gland, it is fully one inch long, somewhat thickened in the middle. The penis is attached by a short muscle, about 4 m.m. long and moderately thickened.

*TROCHOMORPHA CANTORIANA*, (Benson). Pl. i, fig. 13.

*Helix Cantoriana*, Benson, Ann. and Mag. Nat. Hist., 1861, vii, p. 85.

Five specimens which I found on Penang hill (at about 2000 feet elevation) exactly correspond with Benson's description, which was taken from a solitary specimen obtained by Dr. Cantor on the small island Sung-Sung near Penang. The illustration given on plate i will dispense with a repetition of the description quoted above. The apex is smooth, slightly swollen, and there are scarcely more than five whorls in specimens of 10 m.m.

The animal is blackish grey with a very narrow, pale dorsal stripe, quite similar to that of *T. castra*, but by some accident no specimen was preserved in spirit, so I cannot give any further details of its structure; it is, however, certainly a *Trochomorpha*. The specimens were found under a log of old wood.

*TROCHOMORPHA TIMORENSIS*, Martens. Pl. i, fig. 17, and pl. ii, figs. 10-12.

E. v. Martens, in Preuss. Ost-Asiat. Exped., 1867, II, p. 248.

Penang specimens, of which I obtained sixteen, entirely agree in form and structure with the shell described by E. von Martens, with the single exception that the last whorl is not descending near the aperture, but there is an inclination to it, as its terminal portion in adult specimens is slightly more bent downwards than the preceding part (comp. figs. 17*a* and 17*b*). This character is, however, certainly a variable one; it does also occasionally occur in adult specimens of *T. castra* and *T. planorbis*. The differences noticed by E. v. Martens regarding the greater number of whorls, and the larger umbilicus, with less rapidly descending sides, in *Timorensis*, when compared with *planorbis*, are well marked in Penang examples.

The species is found sparingly on or under old wood all over Penang hill; *T. planorbis* was not met with there, but it is a very abundant shell at the Nicobars.

The animal is uniform blackish, mantle more intense black; pedal row distinct and the edge of the foot below it nearly quite smooth; neck and sides covered with small warts; tail gland represented by a very fine slit, scarcely more than half a millimetre long.

The jaw and radula are quite similar to those of *T. castra*. The former is about three quarters mill. broad, with somewhat curved out ends and a broadly rounded central projection in the concave edge. The teeth are very slender, and the lateral denticles are very close to the tip on the centre tooth. The outer denticle descends a little lower down on the laterals, but it

always appears to remain smaller than on the corresponding teeth of *T. castra*; the outermost laterals were not observed, they must be very thin.

The genital organs are distinguished by a very great length of the seminal receptacle and of the seminal duct; the former is one and a half to nearly two inches long; it is somewhat widened near its origin but further on almost throughout equally thin.

Fam. Vitrinidæ.

VITRINA NUCLEATA, n. sp. Pl. i, fig. 12 and pl. ii, figs. 4-6.

Vit. testa depresso ovata, tumidula, tenui, pallide cornea, translucente; anfractibus 3·75, nucleo 1·5 anf. composito, late conico, inflato, lævigato, duobus anf. sequentibus ad suturam adpressis, subcanaliculatis, rapide accrescentibus, nitidis,\* transversim-striis incrementi minutissimis notatis; apertura ampla, per-obliqua, labio undique tenuissimo, ad basin valde recedente, margine supero convexiusculo. Diam. maj. 9, diam. minor 7, alt. test. 5·3, alt. aperturæ 4·8, ejusdem latitudo 6·1 m.m.

A characteristically distinct species, by having the nucleus composed of one and a half whorls, conically tumid, while the next whorl is at its beginning only very narrowly exposed, or almost entirely covered. The outer lip is very thin, almost membranaceous, and simple throughout.

*V. nucleata* is one of the rarest Penang shells. I found three live specimens on the Penang hill in dense forest on old wood, about 1000 feet above the sea, and two more old shells at the base of the hill.

The animal is entirely black, only slightly paler at the front sides of the foot; it is very long and slender, its total length being about four times that of the longer diameter of the shell; the anterior part is the much shorter one, the posterior tapers into a point, and the whole is warty and grooved. The mantle, however, is nearly smooth. In quite fresh specimens the two shell lobes entirely cover the shell, but generally the left lobe covers a little more than one fourth of the last whorl extending from the margin of the mouth, while the right lobe also covers one-fourth of it beginning at the angle of the mouth, but at the same time also envelopes the whole spire. The neck lobes are also well developed, rounded, with simple edges, the left is much larger and longer than the right one. The sole of foot is pale brown, divided by two grooves in nearly three equal parts, of which the median is smooth and the lateral transversely sulcated. Pedal row well marked by a thin groove above and along the entire base of foot.

The jaw is semilunar, radiately finely striated, with a blunt projection in the centre of the concave edge; the outer or convex portion is smooth; it measures about 0·75 m.m. in breadth.

The radula is about two mill. long and half a mill. broad; there are 110 transverse, almost quite straight rows, but only 61 teeth in each of them.

All have very sharply pointed cusps, the central has two small lateral denticles on either side; on the outer ones these denticles almost entirely disappear.

The genital organs are distinguished by a great length of the uterus, at the end of which lies a large albuminous (*ag.*) and hermaphrodite gland (*hg.*). The seminal receptacle (*rs.*) is a long, pedunculated, spacious bag which includes a peculiarly twisted, horny organ, provided on the concave side with short crispate appendage. It is the same problematic organ which I described in *Sesara infreudens*, Gld., and *Macrochlamys* [*Durgella*] *honesta*, Gld., (Comp. J. A. S. B. XL, Pt. II, p. 242 and 250, pl. xvi, fig. 5 and 6, and pl. xvii, fig. 13). Whether this structure represents the amatorial organ and whether that which we call a seminal receptacle really possesses the function which we attribute to it, appears to be as yet an open question. In the present species I found the terminal end of the so-called seminal receptacle filled with a milky substance, which under a high power exhibited a quite irregular flaky appearance.

In other respects the present species does not offer any anatomical peculiarities. The oesophagus is comparatively thin, long, cylindrical. The kidney, situated near the end of the rectum, is very large, of a broadly triangular shape; the liver enormously developed.

Some years passed the *Vitrinæ* had been classed as a subfamily of the *Helicidæ*; more recently they had been by various authors treated with the *Zonitidæ*, in the Oxygnathe group of *HELICACEA*. I think the older classification is preferable, as entered by Binney and Bland in their Land and Fresh-water shells of N. America. But I would prefer to give them, together with *Helicolimax*, *Hyalina* and their allies, a position intermediate between the two families. They combine indeed several of the characters of both. Although they do not possess a terminal mucous gland on the end of the foot (as all *Zonitidæ* do), they have a more or less distinct pedal row, and the sole appears to be often divided by longitudinal grooves. The jaw is entirely or partially finely transversely striated, not quite smooth, as usually in *Zonitidæ*, and not ribbed, as in true *Helicidæ*. However, the teeth, particularly the outermost laterals, have more the pointed character of the former than of the next family.

#### *Fam. Helicidæ.*

*TRACHIA*\* *PENANGENSIS*, n. sp. Pl. iii, figs. 1 and 18-20.

T. suborbiculata, alta, spira breviter elevata, obtusa, modice sed profunde umbilicata, tenui, fere cornea, cuticula luteo-fusca dense et breviter pilosa induta, unicolore; anfractibus 4-5, convexis, sutura profunde subcanaliculata junctis, ultimo ad peripheriam uniforme convexo, ad aperturam paulo descen-

\* Compare, Stoliczka in Journ. A. S. B., vol. xl, Pt. II, 1871, p. 223.

dente, ad marginem umbilici obtuse angulato; apertura semilunari, labio tenui, labro expanso atque reflexo, ad insertionem umbilicalem paululum dilatato, ad basin indistincte subangulato, pallide violaceo tincto. Diam. maj. 16, diam. min. 14·5, lat. aperturæ cum perist. 8·8, ejusd. alt. 8·2 m. m.

As regards the thin, almost horny, fulvous, thickly and finely setose structure of the shell, this species is probably most closely allied to *T. erinacea*, Pfr., but it differs from it, as well as from two other very similar forms, *T. quicta*, Reeve, and *T. customa*, Pfr., by its conspicuously more elevated spire. Other species of similar type, like *T. breviseta*, Pfr., from Siam, *T. Helferi*, Bens., from the Andamans, and four or five others described by Pfeiffer and E. v. Martens have nearly all a more depressed form and mostly sub-angular last whorl, although their spire is somewhat elevated.

The animal is dark chocolate brown, with a very narrow pale dorsal and caudal stripe, the body is laterally somewhat more blackish in front, and tinged brownish behind; the posterior end of the foot is the shorter one, as in *Trochomorpha*, although not to the same extent.

The jaw is quadrant shaped, with about six strong ribs,\* and one or two less distinct ones on either side; it is 1·3 m.m. broad.

The radula is about 2·5 m.m. long., and 1. m.m. broad; there are 95 transverse rows, and 91 teeth in each of them, decreasing in size the more they approach the edges. The centre tooth is slightly smaller than the first laterals. All have a large basal plate, which is on the centre tooth slightly emarginate in the middle of the upper edge; this emargination increases in depth on the laterals, the inner branch remaining smaller, until on the last ones the upper edge becomes represented by two obtuse branches. The hook is on all teeth comparatively small, broad, with a moderately sharp point. On about the tenth tooth a small denticle appears to shew on the outer edge near the tip, becoming more distinct on the following teeth. After the eighteenth lateral, the teeth become somewhat more rapidly shorter, but increase in width until the last are wider than long, or high, and on these the basal plate has almost entirely become obsolete.

The genital organs are more than an inch long. The female portion has a long seminal receptacle, strongly thickened and muscular for some distance from its origin, then passing into a long thin tube and terminating with a moderately enlarged bubble, attached by very thin muscular fibres to the albuminous gland which is situated at the end of the uterus. The vas deferens takes its origin near the upper end of the uterus; it is attached by numerous thin threads at the hermaphrodite opening, and after a short distance enlarges into a muscular tube. At the beginning of this enlargement is a short pointed flagellum (f), and at the

\* Evidently very much like that of *Campylaea*.

other end, where the penis begins, is a retractor muscle. The penis itself has near its base a coecal appendage; its terminal portion, before it joins the hermaphrodite opening, is very thin.

A comparison of the genital organs with those of *Trachia delibrata*, represented in J. A. S. B., vol. XL, Pt. II, 1871, pl. xvi, fig. 1, will shew, that the only essential difference consists in the presence of the small coecal appendage on the penis in *T. Penangensis*. The jaw has fewer and less strong ribs, than that of the former species, but the teeth themselves are extremely similar.

Taking all these anatomical characters together with those of the shell, as noticed in my paper cited above, I think we can consider *Trachia* as a fairly established genus of the HELICIDÆ.

HELI<sup>X</sup> [FRUTICICOLA] SIMILARIS, Fér. Pl. ii, figs. 1-3.

Comp. E. v. Martens in Preuss. Exped. nach Ost-Asien, vol. II, pp. 43 and 270, etc. Stoliczka in J. A. S. B. vol. XL, Pt. II, 1871, p. 224.

On Penang this species is mostly found in the coco-palm plantations up to a height of about 200 feet, never in the interior of large forests and at great elevations. The shells are of the usual small size (larger diam. between 12 and 13 m.m.), with or without a brown peripheral band. The striæ of growth are generally fine, but in some specimens they accumulate to strong ribs which give the shell a very peculiar costate appearance.

I also obtained the species from Malacca, near Singapore, Hongkong, Chusan, Maccao, Canton, &c, northwards it extends through Tenasserim into Burma, where it is associated with a great number of closely allied species, some of which may prove to be mere varieties of it. I may mention *H. boius*, *H. sculpturrita*, *H. Zoroaster*, &c.

In Bengal itself the species is not known, but in Central India it is represented by *H. propinqua*, and on the Andamans by *H. hemiopta*. Judging from the great number of closely allied species in the Indo-Malayan region, there is certainly the greatest probability that the original habitat of *H. similaris* falls within the Indo-Malayan Archipelago, and that it has been introduced into Mauritius, China and South America.

The animal is rather slender, all over strongly warty, brownish fleshy white, or pale brown, the pedal row is very slightly indicated by a fine groove; the pedicles and tentacles are greyish white, mantle dull milky white with a slight vermilion tinge. When the animal is quite fresh the total length of the foot is equal to from two and a half to three longer diameters of the shell.

The jaw is semilunar, about 1 m.m. broad, with three strong central ribs, followed by a somewhat broader one on either side, while the next is only indicated by a faint dark line.



The radula is when compared with the size of the animal large, about 2·3 m.m. long, and somewhat more than one m.m. broad; it is composed of about 90 transverse rows, with 67 teeth in each of them. The central is much smaller than the adjoining laterals, with a long arched cusp. The laterals somewhat rapidly decrease in size after the 14th; on the outermost the basal plate gradually disappears, while the breadth of the teeth exceeds their length.

The genital organs are more complicated than in *Trachia*. The female portion has at its origin a rather short, thick muscular cœcal appendage, which most probably represents the amatorial gland; it is widened near its origin and at its rounded end. The seminal receptacle is a round bag, attached to a long thin peduncle of about the same length as the uterus. The seminal duct is moderately long, but the penis comparatively thick and attached by a strong muscle.

#### *Fam. Bulimidæ.*

##### BULIMUS.—Subg. *Amphidromus*.

The only two species which I found among the coco-palms were *Bulimus atricallosus*, Gould, and *B. interruptus*, var. *citrinus*; the uniform coloured greenish yellow variety. The former is the more common species.

Besides these two, the ubiquitous *Stenogyra gracilis* is by no means rare at the roots of palm trees.

#### *Fam. Clausiliidæ.*

##### CLAUSILIA (PHÆDUSA) PENANGENSIS, n. sp. Pl. ii, figs. 4-6 and 15-17.

C. testa fusiformi, plus minusve attenuata, medio ad anfractum penultimum latissima, non rimata, solidula, castanea, apice submamillata, albescente, anfractibus 9·5 ad 10·5, convexis, sutura simplici junctis, transversim confertissime striolatis, penultimo sensim attenuato; apertura ovata, intus castanea, peristomate modice expanso, undique libero, albescente, plica supra crassa, ad marginem aperturæ continua, columellari immersa, tenui, valde oblique intrante; plicis palatalibus six, prima longissimima, unam mill. a margine suturali distante, ceteris multo brevioribus, subæqualibus, modice curvatis atque fere æquidistantibus.

Var. *brevis*, exquisite fusiformis, vide fig. 6 et 6a; long. 24, lat. 6·2, apert. cum perist. 6 longa, 4·5 m.m. lata.

Var. *elongate fusiformis*, vide fig. 5; long. 26·8, lat. 6·2, apert. 6·9 longa, 4·7 m.m. lata; in hoc specimine apertura exceptionaliter longa est, in speciminibus alteris, forma similibus, longitudo aperturæ 6·2 ad 6·4 observanda.

Var. *exilis*, attenuate fusiformis, vide fig. 4 et 4a; long. 27, lat. 6, long. apert. 6·8, lat. 4·6 m.m.

*Hab.*—Penang hill, frequens.

This is an extremely variable species as regards the shorter or longer fusiform shape of the shell, and also as regards the size of the aperture, but both these variations are very commonly observed in other species of the genus, and particularly in the allied Malayan species *Cl. Gouldiana*, Pfr., *insignis*, Gould,\* and *Sumatrana*, Martens.† All three have a similarly variable shape, and finely striated, moderately convex, whorls, but in the two former the aperture is much shorter of a squarish shape, and in the last it is conspicuously longer; E. v. Martens gives its length at 8 m. m. in a specimen, the total length of which is from 23·5 to 31·5 m. m. In this last species, which also comes nearest to the Penang shell, the whorls appear to be slightly less convex and there are only five palatal plates present.

The animal is uniform grey covered with small pale brown warts, darker on the back, paler on the pedicles, which have very small, black eyes; tentacles very short.

The general anatomical structure agrees with that which I published of *Cl. Philippiana*, (comp. J. A. S. B., vol. xl, pt. II, 1871, p. 174, pl. vi, fig. 8).

The genital organs are distinguished by a very great length of both the uterus and the penis, both of which are much twisted. The only appendage is that of the seminal receptacle, which is comparatively small and narrow, situated at the end of a long peduncle.

The jaw is very short, about 0·5 m. m. broad, apparently smooth; only very faint radiating and concentric lines are to be observed in certain lights.

The radula is about 2 m.m. long and 0·5 m.m. broad; it consists of about 125 rows, with 61 teeth in each row. All are provided with a strongly curved cusp; after about the fifteenth tooth, they rather rapidly decrease in length. Towards the end of each row they become multi-serrated, while the basal plate almost entirely disappears. The last teeth are very short, but broad, almost linear and entire.

CLAUSILIA [PHÆDUSA] FILICOSTATA, n. sp. Pl. III, figs. 7-8.

Cl. testa fusiforme turrita, apice sensim attenuata, subrimata, tenui, pallide cornea; anfractibus 10 ad 11, lente convexiusculis, sutura simplici junctis, ad suturam filiforme marginatis atque infra marginem paulum contractis, transversim oblique dense costellatis, antepenultimo vix latiore quam penultimo, ultimo versus aperturam paululum contracto; apertura ovate subtrigona, postice, (aut supra), subangulata, peristomate expanso, undique libero, plicis

\* J. A. S. B., xli, pt. II, pp. 203, 204, 208, pl. ix.

† Ost-Asiat. Exped., 1867, p. 379, pl. 22, fig. 17.

supera tenui, haud usque ad marginem peristomatis interni extensa, intus in fauce rapide evanescente, columellari approximata, fortiori, valde obliqua; plicis palatalibus circiter decem, supera longissima, a margine distante, duabus vel tribus sequentibus multo brevioribus, cæteris brevissimis, omnibus inter se irregulariter dispositis. Long. 21·2, lat. 4·4; long. apert. cum perist. paulo imperfecto 4·8, lat. 3·6 m.m.; specim. secundi apert. cum perist. perfecto 5·3 longa et 4 m.m. lata.

*Hab.*—Penang hill, cum precedente, sed rarissima.

This species is very closely allied to *Ol. Javana*, Pfr., but the latter has the whorls, particularly the middle ones, somewhat higher, the transverse costulation is a little finer, and more crowded, the palatal plaits are fewer, two according to Küster, three to four according to E. v. Martens; it also appears to have the two labial plaits stronger. I do not know any other species with which the Penang shell can be compared. It appears to be extremely rare; out of three specimens found only one has the aperture with the margins perfectly well developed.

### Fam. Philomycidæ

Binney and Bland, Land and fresh-water shells N America, pt. I, 1869, p. 294.

#### Genus. PHILOMYCUS.

1820. Rafinesque. Comp. 'Complete writings,' by Binney and Tryon, 1864, p. 64.

1821. Férussac, Tabl. syst. des Limaces, p. 14.

1823. *Meghimatium*, Hasselt, Algem. Konst. &c., p. 232; *idem*, Fér., 1824.

1842 (August). *Incillaria*, Benson, Ann. and Mag. Nat. Hist. vol. ix, p. 486.

1842 (Septb.). *Tebenophorus*, Binney, Boston Journal, iv, p. 171, and 1844, Wyman, *ibidem* p. 410.

1866. *Philomycus*, (anatomy of) Koforstein, Zeitsch. Wissensch. Zool., vol. xvi, p. 183.

1866. *Incillaria* and *Meghimatium* (anatomy of), Koforstein, Malacoz. Blätter, vol. xiii, p. 64.

1869. *Tebenophorus*, Binney and Bland, Land and Fresh water shells N. Am. pt. I, Pulm. G. oph., p. 295.

*Philomycus* apud H. and A. Adams, 'Chenu, E. v. Martens &c.

It must be admitted that the original characteristic of the genus by Rafinesque is a very unsatisfactory one, but that is the case with many other old definitions. When Rafinesque wrote that *Philomycus* has no visible mantle, everybody\* could, I think, fancy that the mantle must extend over

\* Binney writes in 1841 (Boston Journ. IV, p. 174) of his *Philomycus dorsalis* corpore .....clypeo nullo,' and on p. 171 of *Tebenophorus carolinensis* 'clypeo lato et elongato, dorsum integrum vestiente,' and still both species have the mantle covering the entire upper surface of the body, and both are *Philomycus* (or *Pallijera* of Morse).

the whole body, if the animal can at all be closely compared with *Limax*, or else it could not be a Mollusc at all. This was indeed well understood by Férussac, who in the next year referred to *Philomycus*, besides the four insufficiently described species of Rafinesque, *Limax carolinensis* of Bosc, well known from description and figure, (copied in Hist. nat. des Moll., pl., 6, fig. 3). And as Rafinesque's species had not been rediscovered and his descriptions not made more complete, *Ph. carolinensis* remained to be considered as the type of the genus, though I do not think that there can be much doubt on the point, that Férussac had correctly interpreted Rafinesque's meaning. In any case there was no sufficient ground for introducing the name *Tebenophorus* for the same species.

Keferstein (loc. cit.) has shewn by the anatomical examination of the three typical species, *Philomycus carolinensis*, (seu *Tebenophorus*), *Meghimatium striatum* and *Incillaria bilineata*, that all three genera have to be united into one. The general anatomy and dentition &c., agree in all, the only traceable distinction of *Phil. carolinensis* consists in the presence of a small amatorial organ, situated at the entrance of the seminal receptacle. The presence or absence of this organ, or even of that of a special amatorial gland (see ante, p. 13), is rightly considered by Keferstein as insufficient for a generic separation of the American from the Indian species. I had repeatedly opportunity of satisfying myself of this by the observation, that the development of that organ does not only appear to depend upon the age of the animal, but often even upon the season or peculiarities of the conditions, under which the animal lives. As far as our materials enable us to judge, we can, I think, look upon *Philomycus* as a well established genus. For the present it has to be regarded as the sole representative of the family. The finely radiately striated (in *Ph. dorsalis* coarsely ribbed) jaw in part resembles that of the VITRINIDÆ, but the dentition has decidedly more the character of true HELICIDÆ.

I have to notice one new species found on Penang.

*PHILOMYCUS PICTUS*, n. sp. Pl. III, figs. 9-14.

Ph. corpore tenuiter cylindraco, plus minusve (35 ad 46 m.m.) extenso, antice rotundate subtruncato, postice acuminato, livido, copiose mucoso, suprâ pallio lævigato, lateraliter atque in parte postica nonnunquam subgranuloso tecto, fasciis tribus longitudinalibus atratis, reticulationibus ejusdem coloris junctis, picto, faciâ centrali latissimâ, duabus alteris tenuioribus ad latus dorsi sitis et a margine inferiore distantibus; orificio pulmonari antice ad latus dextrum in incisioe pallii sito, circiter 5 ad 7 m.m. a terminatione antica distante; pedunculis oculiferis circ. 5 m.m. longis, tentaculis brevissimis, ambobus pallidissimis; pede infrâ transversim plicatello, livido.

During life the length and comparative thickness of the animal changes very rapidly, as may be noticed from a comparison of the two sketches taken from life and one from a specimen preserved in spirit. The animal is covered by a thick layer of mucous secretion, it is very active, and readily burrows in light decomposing vegetable substance. The three black longitudinal bands are connected by a similarly coloured net work which continues, interspersed with, or dissolved into, little dots, to the lower edge of the mantle. The three distinctly marked bands distinguish the present species from the Javaen *Ph. reticulatus*, according to Férussac's figures 2\* and 3 on pl. 8 E., p. 96\*, Moll. terr. et fluv. vol. ii. The peduncles are about 5 m.m. long, provided with distinctly developed globules on which the small black eyes are situated; the tentacles are very short, and when the animal moves about scarcely noticeable; both are very pale coloured.

The anatomy of the species almost perfectly agrees with that given by Kefenstein of *Ph. striatus* and *bulineatus*. The internal pulmonary cavity extends to about one anterior fourth of the length of the body, and in the fresh animal is always well marked by the mantle above it being somewhat inflated. On this inflated portion, the mantle is smooth, on the other parts generally slightly rugose.

The genital organs (comp. fig. 13) have no special amatorial gland. The seminal receptacle is a globular pedunculated bag, situated a short distance from the hermaphrodite opening. In two specimens which I examined, I noticed the development of a strongly fibrous bundle of muscles at the entrance of the receptacle, where it branches off from the oviduct, but there was no special amatorial organ present.

The jaw is semilunar, strongly curved, thin, radiately striated; when laid flat about one mill. broad.

The radula is 2·8 m.m. long, only about 0·5 broad; there are about 170 rows, and 87 teeth in each row: the central tooth with a symmetrical simple curved cusp, the laterals with a more oblique but simple cusp, both it and the basal plate gradually decrease in height until the last teeth become almost linear and form a confluent row.

None of the other organs require any special notice.

I found three specimens of this species among old decaying vegetable matter on the ground at the northern base of Penang hill, about one hundred feet above the sea.

\* E. v. Martens (Preuss. Exp. nach Ost-Asien, Landschnecken, p. 182) refers to this figure as a synonym of Hasselt's *Parmacella reticulata*, which he quotes as *Parmarion reticulatus*. I do not know Hasselt's original figure, but surely the one given by Férussac does not represent a *Parmacella* or a *Parmarion*.

*Fam. Pupidæ.*

This family is represented in India and Burma by *Hypselostoma*, *Boysia* and various subgenera of *Pupa*, all of small size. Among the *Pupæ* found in Burma and the adjacent countries, inhabited by a large number of Malay forms, the majority are referable to Albers' subgenus *Scopelophila*, the type of which is *Pupa Kokeilii*, Rossm. The shells are small, subconic or subcylindrical, composed of 4 to 8 whorls, with a moderately thin, semicorneous or corneous texture, covered by a brown cuticle; the last whorl is rimate at the base, always somewhat rapidly turned to the front, generally slightly ascending at the aperture, which is internally instructed with teeth on the whole peristome; commonly there is a bifid tooth on the inner lip, it is larger than any of the others. Some of the species appear to differ from *Pupilla* merely by the peculiar turn of the last whorl towards the front, thus shewing a strong affinity to *Hypselostoma*. The Indian species of *Scopelophila*, as far as I observed them, have the pedicles well developed and the tentacles short.

A second small group of *Pupa*, which is found in India, Burma and the country southward, is characterised by a subconic or ovate shape, composed of three to five whorls, of a thin corneous texture, covered with a transversely striated cuticle; the last whorl is not ascending, the aperture generally edentulous; the columellar lip is externally near its attachment somewhat expanded, mostly covering the umbilical region, while internally at the base it is twisted and occasionally provided with a small tooth. I propose for this subgeneric group the name

*Pupisoma*,

and regard as the type of it the Moulmein *P. lignicola*, described in J. A. S. B., vol. xl, pt. ii, p. 171, pl. vii, fig. 3. The animals have very short pedicles and barely a trace of tentacles. They generally live on wood.

## PUPA [SCOPELOPHILA] PALMIRA, n. sp. Pl. II. fig. 3.

P. testa ovate cylindræa, rimata, sordide albida, cornea, apice obtusiuscula; anfractibus quinque, convexis, gradatim accrescentibus, sutura simplici junctis, sublævigatis, fere politis, lineis nonnullis incrementi transversis obliquis, exilissimis notata; apertura fere verticali, subquadrangulari, intus quinque-dentata, albida; labro undique expansiusculo atque paulum incrassato, extus infra suturam sinuoso, intus profunde bidentato, (dente supero minori), ad basin dente unico minuto et ad medium collumellæ altero fortiori instructo; labio tenui, adnato, extra medium prope angulum posteriorem aperturæ dente lamelliforme bipartito munito.

Long. testæ 2.15, latit. 1, long. apert. 0.8, lat. 0.6 m.m.

*Hab.*—Penang et in Provincia Wellesley dicta, sub corticem *Cocos nucifera*; testa rarissima.

This is of exactly the same type as the Arrakanese *P. filosa*, described at p. 383 of the Journal for last year, but it is larger, more cylindrical and has one tooth more in the aperture. From *P. Avanica* it differs by less closely wound whorls and by the interal dentition of the aperture.

It appears to be a very rare species. I found one specimen under the bark of a cocoa-nut tree on Penang, and two others on the opposite coast in the Wellesley Province.

PUPA [PUPISOMA] ORCELLA, n. sp. Pl. II, fig. 2.

*P. testa* subglobose conoidea, apice obtusa, angustissime perforata, tenui, cornea; anfractibus 3 5, valde convexis, sutura simplici junctis, transverse filose striolatis; apertura subrotundata, paululum obliqua, edentula; margine externo tenuissimo vix repandiusculo, columellari albescente, vix torto, supra reflexo, umbilicum fere omnino obtegente.

Alt. testæ 1·7, diam. 1·25, alt. aperturæ 0·6 m.m.

*Hab.*—Penang, sub corticem *Cocos nucifera*, haud frequens.

The animal is grey with dusky pedicles, but no perceptible trace of tentacles. The species differs from *P. lignicola* (l. cit.) by a shorter and broader form, more convex whorls, and by a very slightly expanded and thin outer lip. In fresh specimens some of the transverse striae of the cuticle are rather stronger than others, but they very soon wear off.

### Fam. Streptaxidæ.

This family is represented by the single species *Ennea bicolor*, occurring with *Stenogyra gracilis*, though not very commonly. (Comp. J. A. S. B., 1871, vol. xl, pt. ii, p. 169).

### Fam. Veronicellidæ and Vaginulidæ.

I have collected two species, which are by authors usually referred to the genus *Vaginulus*, and with which Blainville's *Veronicella* is considered as identical.

The one species is the same as *Vaginulus Birmanicus*, briefly described by Theobald in Journ. A. S. B., vol. xxxiii, for 1864. It is found about Calcutta, extending throughout Bengal up to the base of the Sikkim hills, through Arrakan, Tenasserim to Penang. A specimen obtained at Singapore does not appear to differ; E. v. Martens' *V. Hasselti*, (Preuss. Exp. Ost-Asien, Landschnecken, 1867, p. 176, pl. 5, figs. 2 and 4) from Sumatra, Borneo, &c., also appears to be the same, and it seems to me very probable that it is the true *Onchidium molle* of Hasselt.

A second species is very closely allied to *Vaginulus Tourannensis*, Ey-doux and Souleyet, (Voyage de la Bonite, pl. 28, figs. 4 to 7), found by Mr. Gaudichaud at Touranne in Cochin China.

A close examination of various eastern species of what authors usually call *Vaginulus* or *Veronicella* appears to me to indicate, that a great confusion has been brought about into the definition of these terms. First of all, we have to return to the typical species of those two generic terms, leaving all subsequent researches regarding other species out of the question.

Blainville's description of his *Veronicella lævis* in 1817 was incorrect as regards the existence of a rudiment of a shell. The mistake was, at least partially, corrected by Blainville in Dict. d. Sc. Nat. vol. 57, p. 348,\* and Keferstein, after discussing the opinions about this genus, in Zeitsch. Wiss. Zool., xv, 1864, defined† *Veronicella* as it ought, I think, to be accepted.

The animals have the sexes distinct in one individuum, the male organ under the right peduncle, the female about the middle of the lower right side of the mantle; tentacles bilobed; the anal and respiratory orifices are at the posterior end; the jaw and teeth of the radula resemble those of the HELICIDÆ. Thus the general anatomical structure of *Veronicella* agrees in some respects with *Onchidium* (comp. Stoliczka in J. A. S. B., xxxviii, pt. ii, 1869, p. 88, pl. xiv), but in this genus the female genital opening lies with the two others at, or close to, the posterior end; the teeth are peculiarly hook-shaped, and there is no jaw present. As one of the characteristic figures of a *Veronicella* I may mention *Vag. Solea*, d'Orb., (Voyage dans l' Am. merid., Moll. pl. 21) from Buenos Ayres, or *Vag. Luzonicus*, Eydoux and Souleyet, in Voyage de la Bonite, Zoologie, vol. II, p. 495, pl. 28, figs. 1—3. Thus our species will have provisionally to stand as

#### VERONICELLA BIRMANICA, (Theob.).

It is found all over the island; up to the top of Penang hill, but is not common, and the specimens are mostly small, about 1 or 1.5 inches. The median dorsal pale stripe generally becomes distinct only in older specimens, and the lower side of the mantle is uniform livid; in very young specimens the pale stripe is absent, and the mantle marked below with dark dots.

The name *Vaginulus* was introduced by Férussac in 1821. Judging from the description of the genus, in part at least, from the arrangement of the species and from the anatomical account given by Blainville, it is, I

\* In this article, Blainville strangely makes a great mistake in considering *Vaginulus*, *Veronicella* and *Onchidium* as identical.

† Comp. also Humbert in Mem. Soc. Ph. & Sc. Nat. Genève, vol. xvii, and E. v. Martens Preuss. Exped. p. 175, *Vaginulus*.



think, clear, that Férussac considered the first described species, *V. Tannaysi* as the type of the genus, (Comp. Moll. terr. and fluv., II, pp. 96 p, 96 q, and explic. des pl. No. 13, pl. 8 c.). Férussac's characteristic of the genus places the pulmonary opening at a distance of two-fifths of the length of the body from the anterior end, and on the lower right side of the mantle; the female sexual opening is said to be on the same side, about the middle; the position of the anus is not mentioned. Blainville's account of the anatomy is not clear and partly contradictory to Férussac's statement. Some of the figures appear to leave no doubt that the position of the female sexual organ is the same as that indicated by Férussac, in others (fig. I and III,) its situation is too much backward. The anus appears to be situated according to figure I near the sexual opening, but again it is said to terminate with the anus at the posterior upper end of the foot. In the figures II and III (l. cit.), which give an insight into the whole anatomy of the animal, the true termination of the intestines is nowhere given. All this is very unsatisfactory.

Eydoux and Souleyet in their figure of *Vaginulus Tourannensis* also record a small opening at the posterior lower right end of the mantle. I can scarcely believe that this is correct; it is probably only a fault of the artist who thought that an opening must exist there, because it is clearly seen in the other species on the same plate, *Vag. Luzonicus*, which is a *Veronicella*.

My reason for doubting the correctness of Eydoux and Souleyet's figure is the very careful examination of the Penang species, which, as already mentioned, is closely allied to *V. Tourannensis*, if not really identical with it.

The Penang species has the following generic characters, as compared with those of *Veronicella*.

The sexes are distinct, the male opening is under the right peduncle, the female sexual opening lies, together with the anus and the pulmonary orifice, at the lower right side of the mantle, about two-fifths of the length of the body distant from the front. The sexual opening is nearest to the edge of the foot, then comes the anal and then the respiratory one; they are only separated by thin laminæ from each other. There is no jaw present, the manducatory organ consisting of a simple muscular tube, much as in *Strep-taxis* or *Testacella*; the radula is short, composed of simple pointed teeth which are absolutely identical with those of the two last mentioned genera. There is no opening whatsoever at the posterior end of the foot or mantle; the pointed end of the intestinal organs is only attached by a bundle of muscles to the terminal inner surface of the mantle.

On p. 96r of Férussac's Moll. ter. and fluv., Blainville says that the upper

border of the mouth is provided with a dental comb ('peigne dentaire'), and further on, that the buccal cavity is supplied on its inner upper surface with very small sharp points ('très petites pointes acérées'). The latter statement evidently refers to sharp pointed teeth of the radula, but does the former mean to indicate the presence of a jaw, such as exists in *Veronicella*? This is a question of great importance; for if the presence of a jaw can be proved, it would certainly not support the generic identification of our Penang *Vaginulus* with *Vag. Taunaysii*.

There are also a few peculiarities in the other anatomical structure, but on the whole this latter well agrees with that given by Blainville of *Vag. Taunaysii*, with the exception of one or two organs which he evidently misinterpreted.

My doubts against a generic identity of *V. Taunaysii* with *Veronicella*, as formerly defined, appear to me to be supported also by external differences in the shape of the body. In *V. Taunaysii*, as well as in the Penang species and in *V. Tourannensis*, the body is slender and high, so to say nearly cylindrical, the globules on the tentacles are well developed, the appendages of the latter large, the posterior end of the foot is pointed and somewhat projecting beyond the termination of the mantle. In *Veronicella*, on the contrary, the body is more depressed and of a generally more ovate shape, the lower appendage on the tentacles is smaller than the tentacle itself, the end of the foot is more rounded and not, as a rule at least, projecting beyond the termination of the mantle.

E. v. Martens, when speaking of *V. Taunaysii* (Preuss. Exp. nach Ost-Asien, Landschnecken, p. 6), says that the slight lateral expansion of the mantle and the higher body distinguish it from all other species collected in India, and this opinion is, I think, strongly in favour of my presumed distinction between *Veronicella* and *Vaginulus*; for it also exactly applies to the Penang species.

Finally, I must draw the attention to the remarkable external similarity in the form of the body of *Vaginulus porulosus*, Fér. (Moll. ter. et fluv. II, p. 96<sup>r</sup>, pl. 8 E, fig. 5) with that of *Testacella*. The former species is recorded after a drawing communicated to Férussac by van Hasselt, and is no doubt from Java or one of the adjoining islands. I think it represents a true *Vaginulus*, and not a *Veronicella*. \*

I have placed the above discussion before my malacological friends, because I consider a satisfactory solution of the points in question of considerable importance. The information is not easily obtainable, as the necessary materials are very much scattered about. If my suppositions prove correct, the so called AGNATHA group, and especially the TESTACELLIDÆ or STREPTAXIDÆ, will appear before us in a quite different light, when compared with the other

groups. They will shew that certain characters remain constant under different physical conditions, while others change, and that the change takes place according to certain principles, affecting similar or the same organs. Extended observations of this kind must give us the key to a correct systematic arrangement.

Our special question cannot be solved, unless Blainville's and Férussac's somewhat contradictory accounts of the structure and anatomy of *Vaginulus Taunaysii* had been satisfactorily settled. I hope to have myself an early opportunity of examining one of these animals, and until such a time I will postpone the detailed description of the Penang species, (and of another new one from Sikkim), together with their anatomy, which requires a careful comparison with that of *Vaginulus* and *Onchidium*, of each of which I will have to describe several interesting new forms.

### *Explanation of plates.*

#### Plate I.

- Figs. 1—3. *Rhysota Cymatium*, (Benson), p. 11 ; a young, an adolescent and an adult shell.  
 „ 4—7. *Rotula bijuga*, n. sp., p. 14 ; four full grown specimens, variable in the height of the spire.  
 „ 8. *Situla carinifera*, n. sp., p. 16 ; 8, natural size ; 8a, 8b, 8c, enlarged views.  
 „ 9. *Macrochlamys stephoides*, n. sp., p. 17 ; three views in natural size.  
 „ 10. *Microcystis palmicola*, n. sp., p. 18 ; 10, natural size ; 10a, 10b, 10c, three views enlarged.  
 „ 11. *Helicarion permolle*, n. sp., p. 18 ; 11, twice the natural size ; 11a, 11b, 11c, 11d, views in natural size.  
 „ 12. *Vitrina nucleata*, n. sp., p. 23 ; 12, front view in twice the natural size ; 12a, 12b, 12c, three views in natural size.  
 13. *Trochomorpha Cantoriana*, (Benson), p. 22 ; three views in natural size.  
 14—16. „ *castra*, (Benson), p. 21 ; 14, 14a, 14b, three views in natural size ; 15, side view of a specimen from Calcutta ; 16 and 16a, top and lower views of a Darjiling specimen.  
 17. *Timorensis*, Mart., p. 22 ; four views in natural size.

#### Plate II.

- Figs. 1—3. *Fruticicola similis*, Fér., p. 26.  
 4—6. *Vitrina nucleata*, Stol., p. 23 ; 4a, represents the side view of the problematic amatorial organ enclosed in the *bursa seminalis*.  
 7—9. *Trochomorpha castra*, (Benson), p. 21.  
 10—12. „ *Timorensis*, Mart., p. 22.  
 13—15. *Rhysota cymatium*, (Bens.), p. 11.  
 16—18. *Rotula bijuga*, n. sp., p. 14.  
 19—20. *Macrochlamys stephoides*, n. sp., p. 17.  
 21—30. *Helicarion permolle*, n. sp., p. 18.

All the figures are enlarged ; the measurements in natural size are given in the text referred to.

## Plate III.

- Figs. 1. *Trachia Penangensis*, n. sp., p. 24; three views in natural size.  
 „ 2. Pupa [*Pupisoma*] *orcella*, n. sp., p. 33; 2, natural size, 2a, 2b, enlarged.  
 „ 3. Pupa [*Scopelophila*] *palmira*, n. sp., p. 32; 3, natural size, and two views enlarged.  
 „ 4—6. *Clausilia* [*Phædusa*] *Penangensis*, n. sp., p. 27; 4, 4a, attenuated var.; 5, elongately fusiform var.; 6, 6a, fusiform variety; all figures in natural size.  
 „ 7—8. *Clausilia* [*Phædusa*] *flicostata*, n. sp., p. 28; views of two different specimens in natural size.  
 „ 9—14. *Philomorus pictus*, n. sp., p. 30; 9, 9a, 9b, three views taken from a specimen in spirit; 10 and 11, two views of the same specimen in different states of expansion, taken from life; all these figures are in natural size, but the other figures, representing the genital organs, the jaw and teeth, are enlarged.  
 „ 15—17. *Clausilia Penangensis*, vide p. 27.  
 „ 18—20. *Trachia Penangensis*, vide p. 24.

## Explanation of the letters used on pl. II and III.

ho = hermaphrodite opening.

ut = uterus.

al = albuminous gland.

vd = vas deferens.

ag = amatorial gland.

p = penis.

m = retractile muscle.

rs = receptaculum seminis.

po = pulmonary opening.

an = inner, or posterior, angle of mouth.

pn = peripheral angle.

u = umbilicus.

rs = right shell-lobe.

rn = „ neck lobe.

ls = left shell lobe.

ln = left neck lobe.

The small letters below the teeth refer to the distance of each tooth from the respective central tooth in each series.

ON *NEPHROPSIS STEWARTI*, A NEW GENUS AND SPECIES OF MACRUBOUS CRUSTACEANS, DREDGED IN DEEP WATER OFF THE EASTERN COAST OF THE ANDAMAN ISLANDS,—by JAS. WOOD-MASON.

(Read 7th August, 1872, received 16th January, 1873).

[With plate IV.]

In April of last year, I was deputed by the Trustees of the Indian Museum, with the sanction of the Government of India, to proceed to the Andaman Islands for the purpose of making a collection illustrative of the marine fauna of that part of the sea of Bengal in which those islands are situated. I reached Port Blair about the 6th of April, and immediately put myself in communication with the Chief Commissioner, who at once placed at my disposal a well-manned boat and a small steam-launch, with which I dredged for nearly two months with much success from low-water line down to near 50 fathoms. Towards the end of my stay, General Stewart knowing my intense desire to try my fortune in deeper water, placed at my disposal for one day the S. S. "Undaunted" which had been recently armed and put into commission for service as a guard ship. The time allowed was short, but sufficiently long to enable me to bring away samples of the life supported by the sea-bed at, and beyond, the 100 fathoms' line, and to ascertain that the sea-bed was uniformly covered with a thick deposit of fine olive-coloured mud derived from the waste of the coral-reefs and of the sandstone and serpentine rocks of the islands.\* This mud was not very productive, yielding only a few annelids, but was crowded with dead shells of Pteropods and *Dentalium* and with fragments of a large Brachiopod.

It was in the last cast of the dredge that I had the good fortune to capture the interesting addition to the crustacean fauna of these seas, described in the following pages. It is closely allied to *Nephrops Norvegicus* of northern European seas, so closely allied, indeed, that were it not for the absence of the squamiform appendage of the antennæ, I should be under the necessity of placing it in the same genus as a second species. The absence of this appendage, however, leaves me no choice but to establish a new genus for its reception.

\* The following rough analysis by Mr. Tween, the chemist of the Geological Survey of India, will show the proportion of insoluble matter :

|                                                     |       |
|-----------------------------------------------------|-------|
| Soluble in H Cl mostly Ca O Co <sub>2</sub> , ..... | 42.8  |
| Insoluble clay and sand, .....                      | 57.2  |
|                                                     | <hr/> |
|                                                     | 100.0 |

The discovery in these warm seas of a very near, of the nearest ally in fact, of so characteristic a cold-water species, remarkable though it is, will not appear so surprising when I mention the fact that my crustacean lived and burrowed in the mud of the sea-bed at a depth of nearly 300 fathoms in a temperature not certainly exceeding 50° Fahr.

One of the chief points of interest attaching to this new form lies in the loss of its organs of vision by disuse, as in *Calocaris MacAndrewæ*, Bell, in *Cambarus pellucidus*—a member of the same family as that to which *Nephropsis* belongs—and in the other crustaceans and animals inhabiting the caves of Carniola and Kentucky. I not only agree with Mr. Darwin\* in attributing the loss of the eyes to disuse, but I also regard the great length and delicacy of the antennæ, and the great development of the auditory organs as modifications effected by natural selection in compensation for blindness.†

NEPHROPSIS, gen. nov.

Diag. *Antennal scale absent.*

NEPHROPSIS STEWARTI, sp. nov. Pl. IV.

Body covered with fine rounded tubercles and with a short but dense pubescence. The carapace is sub-ovoid, armed on each side, just externally to the base of the rostrum, and behind the anterior margin, with an acute forwardly directed spine; a similar spine springs from each side of the anterior margin itself at about the level of the upper surface of the antennal peduncle; the basis of each of these two spines is confluent with a conspicuous convexity to be seen just behind it; immediately in front of each of these convexities lies a smooth, slightly excavated surface bounded in front by a curvilinear row of tubercles. The cervical suture, dividing the carapace into an anterior or cephalostegal, and into a posterior or omostegal portion, is broad and deeply impressed mesially and laterally, until it reaches the level

\* Origin of Species, 5th Edit., pp. 171-173.

† Since these remarks appeared in the abstract of my paper (Proc. Asiat. Soc. Ben. viii, 1872, p. 151) Dr. Hagen's Monograph of N. American *Astacidae* has reached Calcutta, and from it I give the following extract, on account of its obvious applicability to the species here described, merely remarking that the perusal of it led me to note also the stoutness of the rostrum and the great development of the cephalostegal spines in *Nephropsis* as compared with the slenderness of the one and the minuteness of the others in *Nephrops*: "But it seems to be a somewhat well recognized law in nature (Rathke, Metamorph. Retrograd., p. 135) that if any part is atrophied, or stopped in development, the nearest parts show an abnormal increase of development. This is apparently the case in *C. pellucidus*; the eyes are atrophied, and the rostrum, the fore border of the cephalothorax, the antennal lamina, the basal joint of the inner antennæ, and the epistoma are altered or largely developed." Op. Cit. 34.

of the anterior margin of the epistoma when it bends boldly upwards and backwards upon itself passing into the well-defined semicircular depression that bounds the lateral convexities described above. The cardiac region is broader than long, very convex transversely and bounded on each side by a densely-tuberculated elevation which running backwards, downwards, and forwards along the line of the granulated rim of the branchiostegite, and finally bending upwards almost opposite the origin of the second pair of abdominal appendages, passes again into the swollen anterior boundary of the omostegite; the ovoidal area thus limited off is more sparsely beset with tubercles and presents a marked depression on its anterior half.

The rostrum carries on each side a most acute spine directed upwards and forwards, and curved slightly inwards; and above presents two roughly granulated ridges coalescent towards the tip but divergent at the base; beyond the spines it is canaliculate on each side, above and below, and each lateral ridge is fringed with long hairs; below it is carinated and coarsely granulated at the base. A faint linear impression, continuous with the groove between the ridges on the rostrum, passes along the middle line of the carapace almost to its posterior border; situated in this line, and marking the anterior limit of the convex gastric region, lies an almost erect spiniform tubercle.

*Antennæ and antennules.*—The peduncles of these appendages lie as in *Nephrops Norvegicus* in the same horizontal line, and their inner margins are ciliate. The basal joint, or coxocerite, of the former is extremely short, and wants the apical spine in *Nephrops*, but the perforated conical process on its inferior surface is remarkably salient; the second is devoid both of the prominent spine into which, in *Nephrops*, its distal and external angle is produced, and of the squamiform appendage or scale seen in all the other recognized genera of *Astacidae*,\* and developed to such an extraordinary degree in Carideous Crustacea; one or two small folds or impressions between, or upon, the second and fourth joints being all that remains of the antennal scale, and of the rudimentary joint that in *Nephrops* corresponds to the moveable spine of *Astacus*.†

\* The antennal scale in *Astacoides* escaped the notice of Guérin who founded his genus on its supposed absence.

† There appears to be no doubt but that the antennal scale is the representative of the outer of the two appendages borne upon the protopodite at an early stage of embryonic life, and, if the moveable spine in *Astacus* and its undoubted homologue in the antennæ of *Nephrops* represent the inner of those appendages, then must the three distal joints of the peduncle with the flagellum be looked upon, as Dr. Fritz Müller looks upon them, as a new formation (*Neubildung*) and no longer as being in serial homology with the five distal joints of the other appendages, *e. g.*, of an ambulatory leg, which represent the endopodite, the exopodite being completely aborted or represented at most, as Rolleston remarks, by the annular constriction on

The flagella of the antennæ are remarkably long and of excessive fineness at their extremities.

The basal joint of the antennules has its upper surface greatly inflated, owing to the remarkable development of the auditory organ to which, in most Podophthalmatous Crustacea at any rate,\* this joint gives lodgment; and the almost globular appearance of the joint as seen from the side contrasts strongly with the flatness of its upper surface in *Nephrops* or *Astacus*. Of the two remaining joints of the antennular peduncle, the first is short and cylindrical, being less than half the length of the last which in *Nephrops* is short and equal to that which precedes it. The peduncle terminates in the usual manner in a double flagellum, the outer branch of which is conspicuously stouter than its filamentous and cylindrical fellow, perceptibly compressed, and thickly fringed below with short hairs along its distal third.

The *epistoma* is much the same as in *Nephrops*, save that its posterior edge is straight and presents two small tubercles which give it the appearance of being slightly roundly-emarginate in the middle.

The *external maxillipeds* and the parts of the mouth in front of them are identical in structure with those of *Nephrops*.

The *eyes* are completely rudimentary, neither pigment nor corneal membrane being developed; the peduncles indeed are present, but even these are short, subcylindrical, mere aborted structures, concealed entirely from view by the stout base of the overhanging rostrum; in spirit they have become perfectly blanched like the rest of the appendages, but in life the delicate rose-pink coloration of the animal extended itself to their very tips. The peduncles are far less conspicuous from the side view than represented in the plate.

The first pair of *abdominal appendages*, those which bear the great *chelæ*, are unfortunately absent, the specimen having lost its claws a considerable period previous to its capture, as the presence of uncalcified reproduced rudiments of these appendages indicates; the other legs are smooth and slender; the second and third pairs are didactyle; of these the former has both its upper and lower margins, from the base of the carpopodite to the extremity of the claws, fringed with long hairs; the latter, much the slenderer as well as the longer of the two, has its propodite greatly elongated, and its claws only are ciliated. The fourth pair, the longest of all and ciliated only on the outer face of the dactylopodite, and the fifth, about as long as the second pair, are monodactyle.

the ischiopodite. For the facts relating to the transformation of the embryonic exopodite into the antennal scale of the Prawn *pari passu* with the budding out of the flagellum and the abortion of the endopodite, *vide* Fritz Müller's admirable essay on the development of the crustacea entitled "Für Darwin," p. 41, fig. 81.

\* The caudal ear of *Mysis* forms an exception to this.



The last abdominal somite is immoveably united to that which precedes it as in *Nephrops* and the common Lobster;\* and the sternum is linear as in the *Astacidae* generally.

*Post-abdomen*.—The post-abdomen is gradually attenuated to the extremity of the telson. The appendages of its first somite are as completely rudimentary as they are in the female of *Nephrops Norvegicus*;† those which follow are long and slender, their foliaceous branches being very narrow, produced to a sharp point, and fringed with excessively long cilia. All the terga are covered with minute rounded tubercles, and present at their anterior ends, just behind the tergal facets, a broad smooth transverse groove with its hinder margin convex backwards.

The pleuron of the first somite is precisely similar to that of *Nephrops Norvegicus*, but those of the remaining somites are even more acutely triangular than in that species, and have their margins denticulate and furnished with a fringe of long cilia. In all the somites, with the single exception of the first, the tergal and pleural regions are most sharply defined as such, the former not curving continuously with the latter but terminating abruptly at the level of the ventral chords in a line convex outwards; so that, if a somite were detached, deprived of its ventral chord and flattened out on the table with its dorsal surface uppermost, the imaginary continuation from pleuron to pleuron of the plane in which these pleura laid, would pass below that of the surface of the tergum.

The 'swimmeret' constituted as in all other Macrurous Crustacea by the highly modified and backwardly placed appendages of the last postabdominal somite and by the 'telson,' differs in no particular of more than specific value from that of *Nephrops*; the mesial element, or *telson*, is longer in proportion to its breadth, its greatest breadth, being a transverse line separating its anterior from its middle third, and not at the base as in *Nephrops*, is slightly more truncate posteriorly, and the oblique rounded elevations, that gradually narrow as they pass backwards into the spines at its postero-

\* On characters furnished by the claws alone Dana artificially divides the recognized genera of *Astacidae* into two groups, typified respectively by *Astacus* and *Nephrops*; the first of these is further subdivided according to the number of the branchiæ and the mobility or immobility of the last abdominal somite. But no mention is made of the fact that this is firmly fixed in *Nephrops* too. If *Paranephrops*, a genus including only freshwater forms, should turn out to have a mobile last abdominal somite, then we shall have this curious fact presented to us, viz., that all those members of the family *Astacidae* which live in freshwater or are terrestrial (*Engaus*) have this somite moveably united by membrane only to that which precedes, while those of them that are marine have it fixedly united to the rest of the sternum.

† The ventral plates of the 2nd, 3rd and 4th postabdominal somites in the males of *Nephrops Norvegicus* have an erect spine in the middle line, but the females exhibit no trace of such.

lateral angles, are stronger than in *Nephrops*. The outer plate of the lateral elements of the swimmeret is moveably articulated at its posterior third as in the rest of the *Astacidae*, but the sutural line is curved and the posterior margin of the proximal and larger division exhibits hardly a trace of the overlapping denticulations seen in other *Astacidae*.

Length from tip of rostrum to the posterior margin of telson, .... 98 mm.

Length of carapace in middle line, ..... 42 mm.

" " postabdomen, ..... 56 mm.

therefore the postabdomen : carapace (rostrum incl.) ::  $1\frac{1}{2}$  : 1 exactly.

and the length of body : that of postabdomen ::  $1\frac{1}{2}$  : 1 "

The only specimen (a female) obtained was dredged in from 260 to 300 fathoms about 25 miles off Ross Island on the eastern coast of the Andamans. That the specimen was really brought up from this great depth is certain from the unmistakable signs of crushing from contact with the lip of the dredge, from its position in the dredge bag and from its firmly adherent greenish coating which appears to indicate that like *Calocaris MacAndrewæ* it was a burrower.

In conclusion I have to thank Captain Beresford, the commander of the vessel, for his skilful management of the sounding-line and for the zeal displayed by him in carrying out my wishes during our too short cruise.

I have much pleasure in connecting with this extremely interesting species the name of Major General Donald M. Stewart, C. B., Chief-Commissioner of the Andaman and Nicobar Islands, to whose ever ready help the success of my trip was so largely due.

#### Explanation of Plate IV.

Fig. 1. *Nephropsis Stewarti*, ♀, nat. size.

Fig. 2. Upper view of carapace of the same.

Fig. 3. Swimmeret of *N. Stewarti*.

Fig. 4. " " *Nephrops Norvegicus*.

Fig. 5. Inferior view of antennary region of *N. Stewarti*.

Fig. 6. " " " " " *N. Norvegicus*.

Fig. 7. Sternal region of *N. Stewarti*.

Fig. 8. " " " *N. Norvegicus*.

ON NEW OR LITTLE KNOWN SPECIES OF PHASMIDÆ. PART I,—*Genus Bacillus*,—by JAMES WOOD-MASON of Queen's College, Oxford.

(Read 7th August, 1872; received February 9th, 1873).

[With plates V, VI and VII.]

The difficulties that have hitherto defied all attempts at anything like a philosophical and natural classification of this interesting and truly remarkable family of Orthopterous Insects, although in a great measure due to the extraordinary extent to which protective modification has involved all parts of the body throughout the group, must be in part, at any rate, ascribed to our ignorance in so many cases of the opposite sexes of the species; and the discovery that *Acanthoderus lacertinus*, Westw. is the female of *Lonchodes luteoviridis* of the same author, renders it extremely probable that these latter difficulties will be found to be further complicated by other cases of the same nature. As instances of the value of a knowledge of the opposite sexes in the limitation of genera, I need only adduce the fact that the capture of *Acanthoderus bicoronatus*, West., and *Acanthoderus semiarmatus*, Westw., in copula with their respective males will necessitate the removal of those species, together with their allies, to the genus *Lonchodes*. Thus at the very outset of my researches, I am enabled, by the inestimable advantage of a residence in the great distributional area or metropolis of the family, to withdraw from a genus some of the most bizarre of its extremely heterogeneous contents. Since the publication in 1859 of Professor Westwood's classical Monograph of the family, a large number of new or imperfectly known species has been described or remarked upon by various authors,\* but chiefly by

\* Giebel, Zeitschrift für d. gesammt. Naturwissensch. xviii, p. 113.

Stål, Öfversigt af Kon. Vetensk. Akad. Forhand. xv, p. 308.

Coquerel, Ann. Soc. Entom. Fr. 1861; p. 495, pl. 9, fig. 1; Bull. Soc. Ent. Fr. 1866, pp. xxiii-xxiv.

Westwood, Proc. Ent. Soc. Lond, 1864, p. 16; Ann. Soc. Ent. Fr. 4e Sér. t. iv, pl. 6.

Walsh, Proc. Ent. Soc. Phil., iii, p. 409.

Philippi, Stettin Ent. Zeit. 1865, p. 64.

Murray, Ann. and Mag. N. H. 3rd Ser. xviii, p. 265-268.

Kaup, Proc. Zool. Soc. Lond. 1866, pp. 577-578.

Souder, Proc. Bost. Soc. Nat. Hist. xii, pp. 99 and 340.

Lucas, Ann. Soc. Ent. Fr. 4me Série, t. ix, Bulletin, p. xxv.

Gerstaecker, Archiv für Naturgesch. xxxv, p. 211.

Bates,\* de Saussure† and Kaup‡ whom I mention by name on account of the extent and of the extreme value of their contributions. These numerous additions will be enumerated under the genera to which they belong.

#### GENUS 1.—*BACILLUS*, LATR.

Eleven new species have been referred to this genus since the appearance of Professor Westwood's monograph; of these one, viz., *B. patellifer*, Bates, is nearly certainly identical with *B. ? Artemis*, Westw., and two others, viz. *B. gramineus* and *aspericollis*, Bates, are most probably, as indeed the author of those species himself suspects, the opposite sexes of one species. The necessary deductions being made, eight remain, which, added together with those described below to the thirty-eight recognized by Westwood, bring up the total of known species of *Bacillus* to fifty-live.

*BACILLUS FUSCOLINEATUS*, n. sp. Pl. V. Fig. 7.

♂ Extremely slender, filiform, cylindrical. Antennæ of the length of the metathorax, 17-jointed; first joint depressed but not expanded, carinate above, with sub-parallel margins, the inner one of which is raised; second joint nearly twice as long as broad, sub-depressed; the rest filiform. Head scarcely narrowed from the eyes; a brown streak passes from the eye along

\* Descriptions of Fifty-two New Species of Phasmidæ, with Remarks on the Family, Trans. Linn. Soc. Lond. Vol. xxv, pt. I, pp. 321-359, pl. xiv, xiv.

† Rev. et Mag. de Zool. 1859.

Ann. de la Soc. Ent. de Fr. iv, Sér.

Rev. et Mag. Zool. 1861.

Phasmidarum nov. species nonnullæ Rev. et Mag. de Zool. 1868. pp. 63-70.

Mélanges Orthoptérologiques, 2me Fasc. Mém. Soc. Phys. de Genève, xx, pt. 1, pp. 227-326, pl. 2, 3.

‡ Ueber die Eier der Phasmiden. Berlin Entomologische Zeitschrift, Vol. 15, 1870. Neue Phasmidæ.

*Bacillus (Ramulus) Humberti*, ♂ ♀, (= *Lonchodes* sp.) Saussure, Ann. Soc. Ent. Fr. 1861, p. 469. Hab. Ceylon.

*Bacillus (Baculum) ramosus*, ♀, Sauss. Revue de Zool. 1861, 128, et Mém. Orth. Fasc. II, p. 114. Hab. Brazil. (?)

*Bacillus carinulatus*, Sauss. ♂ ♀, Revue de Zool. 1868, 63. 1. et Mém. Orth. 1869. Fasc. II, p. III, Pl. II, fig. 1. ♀ Hab. Ceylon.

*Bacillus gramineus*, Bates, ♂ Trans. Linn. Soc. Lond. 1865, pt. I, p. 326, pl. xiv, fig. 4. Hab. Natal.

*Bacillus aspericollis*, Bates, ♀, l. c., p. 327. Hab. Natal.

*Bacillus Guenéei*, Bates, ♂ l. c., p. 327, Pl. xiv, f. 14 a. Hab. Natal.

*Bacillus patellifer*, Bates, ♀ (? = *Bacillus ? Artemis*, Westwood), l. c., p. 328. Hab. Darjiling!!!

*Bacillus Scytale*, Bates, ♀, l. c., p. 328, pl. xiv, fig. 9. Hab. Ceylon.

*Bacillus leprosus*, Gerst., ♀, Arch. für Naturgesch. xxxv, p. 211. Hab. Zanzibar.

*Bacillus Gerhardtii*, Kaup, ♂, Proc. Zool. Soc. Lond. 1866. Hab. New Zealand.

*Bacillus Geisovii*, ♂, Kaup, loc. cit.,

each side of the body as far as the commencement of the fourth abdominal segment where it becomes somewhat interrupted; the interval between this line and the margins of the dorsal arcs of the body is silvery white; below, the insect is of an uniform light yellowish green; above, between the brown lateral lines, darker green; the meso- and meta-notum are indistinctly carinate down the middle, and under a moderately powerful lens appear to be marked with delicate wavy transverse striæ; the striation becomes less distinct on the abdominal segments. The abdomen is slightly expanded at the junction of its 4th and 5th segments from which latter it sensibly decreases in width to the apex of the seventh, whence it widens to a trifling extent; seventh segment equal to about  $1\frac{1}{2}$  times the 8th, exactly twice as long as the 9th which is obtusely rounded at the extremity and above presents a median and two lateral less distinct ridges; these latter curve inwards at their apical ends, enclosing a shield-shaped area. Posterior margin of the terminal ventral segment slightly emarginate.

Legs simple, of excessive tenuity; anterior very slightly longer than the posterior pair; intermediate shorter by the length of their own tibia than the former. Cerci long, obtuse, porrected beyond the apex of the abdomen, slightly forcipated and grooved at the sides.

Total length 22 lines; head  $1\frac{1}{2}$ , prothorax 1, mesothorax  $4\frac{1}{2}$ , meta-thorax  $3\frac{1}{2}$ , abdomen  $9\frac{1}{2} + 2\frac{1}{2} = 11\frac{1}{2}$ ; antennæ  $3\frac{1}{2}$ .

- Hab. Murree, Panjab. One specimen collected by Dr. W. Waagen.

*BACILLUS HISPIDULUS*, n. sp. Pl. VII. Figs. 2-3.

♂ Filiform, slender, sordid, with a dark-green median dorsal streak, extending from the apex of the mesothorax to the extremity of the abdomen. Head sub-ovate, with the sides slightly convergent posteriorly, antennæ 16-jointed, joints very distinct; first joint depressed but not expanded; second twice as long as broad, cylindrical, its proximal end the broader. Mesothorax hardly narrower in front than behind. Meso- and meta-notum with a raised median line and a few minute tubercles on their lateral margins. Abdomen cylindrical and filiform to the apex of the 6th segment, whence it suddenly expands to the junction of the 7th and 8th, whence it narrows to its truncate extremity which appears to be constricted between the 8th and 9th segments; six basal segments slightly expanded at their articular ends; 9th segment strongly carinate; the cerci curved and projecting at its postero-lateral angles.

Legs long, slender, and simple; first joint of anterior tarsi greatly elongated; rather more than twice as long as the remaining joints taken together.

Total length  $24\frac{1}{2}$  lines, antennæ 4, head  $1\frac{1}{2}$ , proth. 1, mesoth.  $5\frac{1}{2}$ , metath.  $4\frac{1}{2}$ , abd.  $10\frac{1}{2} + 2\frac{1}{2} = 12\frac{1}{2}$  lines.

♀ Much more robust, with a well-defined median raised dorsal line along the whole length of the body, antennæ absolutely shorter than those of the male, but with the basal joint strongly carinate and more expanded. The mesothorax is visibly attenuated in front from the commencement of its apical third, meso- and meta-notum with a few minute warts along their lateral margins; meso- and meta-sternum with a few similar warts scattered over their surface.

The abdomen is sub-fusiform, depressed to the apex of the 6th segment, and has a distinct ridge, which can also be detected on the thorax, running internally and parallel to the lateral margins of all its dorsal segments except the last; its five posterior segments have another ridge on each side midway between their sides and the median ridge. The posterior margin of the sixth ventral is produced in the middle into a sharp spine with a broad base. The seventh segment is nearly as long as the two last together; these are subequal. The last is subtruncate at its extremity beyond which projects a small triangular azygos plate carinated above. Cerci, in form of a tall four-sided pyramid with its angles rounded, project at the postero-lateral angles of last segment.

Operculum spatulate in outline and flat below, with a broadly rounded extremity, not extending beyond the middle of the last segment.

First joint of tarsus in anterior legs as in the male. The body is covered with very short setæ in both sexes.

Total length, 31 lines, ant.  $3\frac{1}{2}$ , head  $2\frac{1}{2}$ , proth.  $1\frac{1}{2}$ , mesoth.  $7\frac{1}{2}$ , metath.  $5\frac{1}{2}$ , abd.  $15\frac{1}{2} + 2\frac{1}{2} = 17\frac{1}{2}$  lines.

*Hab.*—South Andaman. Three males and three females, of which two were taken in copulâ.

I have received from Dr. Stoliczka, who obtained it from the Arakan coast, an insect differing from the male insect above described only in its greater length, in the absence of tubercles on the thorax, and in having two more joints to the antennæ; the measurements are as follows: -

Total length 32 lines: ant. 6, head  $1\frac{1}{2}$ , proth.  $1\frac{1}{2}$ , mesoth.  $7\frac{1}{2}$ , metath. 6, abd.  $13 + 2\frac{1}{2} = 15\frac{1}{2}$  lines.

*BACILLUS OXYTENES*, n. sp. Pl. V. Fig. 3.

♀ Excessively long and slender. Head unarmed, narrow, almost cylindrical, being but slightly broader in front than posteriorly, notched behind in middle. Antennæ 28-jointed, as long as the terminal segment of the abdomen; first joint depressed, carinated above and expanded, second longer than broad, also depressed. Mesothorax much longer than the metathorax, sparsely granulated above and below, slightly expanded at the insertion of the legs, otherwise of perfectly uniform width; meta-thorax with only a few scattered granules above and below; meso- and meta-notum with a dark raised mesial line. Abdomen long, perfectly smooth, very gradually and

regularly attenuated from its base to its almost indescribably acute, deeply-cleft, slightly recurved, and strongly compressed extremity. The seventh segment is hardly twice as long as the 8th, which is about a fifth of the length of the last; this has a perceptible upward curvature and is cleft nearly to the insertion of the minute conical *cerci*. The operculum is subdepressed, acutely pointed at the extremity, carinated below and reaches the commencement of the middle third of the last segment, where the *cerci* are inserted.

Legs long, but rather stout as compared with the body, triquetrous; the fore femora are serrated for more than two-thirds of the length of the straight portion, intermediate femora with two or three triangular spines close together above near the base; posterior ones with one or two. Tibiæ with a well defined but not very salient foliaceous carina below; four posterior ones with minute spinules on all their crests. The right middle leg is a reproduced limb, having but four joints to the tarsus and a single spine on the femur.

Total length of the body 4 in. 9 lines; antennæ  $6\frac{1}{2}$ : head  $2\frac{1}{2}$ ; proth. 2; mesoth.  $11\frac{1}{2}$ ; metath.  $8\frac{1}{2}$ ; abdomen  $23\frac{1}{2} + 10 = 33\frac{1}{2}$  lines.

Abdomen: rest of body :: 1.4255 &c.: 1.

*Hab.*—Pegu Yomah, collected by Mr. S. Kurz, the botanist at the Calcutta Botanic Garden, during his recent botanical tour through Burma and the Tenasserim Provinces.

In the form of the terminal segments of the body, this species approaches *B. Regulus*, Westw. ♀ (Cat. p. 8, Pl. XXII).

#### BACILLUS LÆVIGATUS, Pl. V. Fig. 4.

♀ Very slender and cylindrical and smooth. The head is armed with two minute blunt erect spines between the eyes, and is slightly narrowed behind; its posterior margin with 3 or 4 notches. Antennæ exactly half the length of the mesothorax; first joint depressed and somewhat expanded, feebly carinate above, its outer margin more convex than the inner; second joint fully as broad as long, depressed.

Abdomen extremely long and slender, tapering very gradually to the apex of the seventh segment; whence it very slightly expands to the basal half of the last which suddenly narrows to its extremity; this is divided by a short cleft into rounded tips. 7th dorsal segment equal to 8th, half as long as the last which is carinate above. *Cerci* pointed. Operculum narrow depressed, obtusely pointed, reaching the end of basal third of last segment.

Legs simple; anterior pair tolerably long; anterior femora serrated for three-fourth of the length of upper crest. The first joint of anterior tarsi is twice the length of its homologue in the intermediate legs, which is rather shorter than that of the posterior legs.

Total length of body 2 in. 10 lin, ant.  $3\frac{1}{2}$ , head  $1\frac{1}{2}$ , proth.  $1\frac{1}{2}$ , mesoth.  $6\frac{1}{2}$ , metath. 5, abd.  $15\frac{1}{2} + 3\frac{1}{2} = 19\frac{1}{2}$  lines.

*Hab.*—Samagooting, Naga Hills, Assam. One immature specimen collected by Captain Butler. This species is closely allied to *B. Westwoodii*.

BACILLUS WESTWOODII, n. sp. Pl. VI. Fig. 3.

♀ Elongate, slender, sub-cylindrical, convex. Head narrowed from the eyes to the base, with its sides slightly convex, armed between the eyes with two forwardly and slightly outwardly directed spines; and with its posterior margin faintly notched in the middle and on each side. Antennæ more than half as long as the mesothorax, from 21 to 26-jointed; first joint carinated above and depressed but not expanded; second joint nearly as broad as long; the rest filiform with the exception of the last which is thickened at the tip. Mesothorax slightly narrowed in front and, with the metathorax, somewhat expanded at the insertion of the legs. The abdomen is narrowed from the base to the apex of the first segment, expands again to the apex of the second, maintains pretty much an uniform width for the next two or three segments and finally gradually tapers to a point. The seventh dorsal segment is twice the length of the eighth, but hardly exceeds the last. This is cleft and slightly compressed at the extremity. The operculum is somewhat boat-shaped, below strongly carinate for its posterior half, and comes into such close and complete opposition with the margins of the terminal dorsal segments, with which it is coincident, as to conceal from view the genital parts, permitting only the tips of the *cerci* to emerge. Legs triquetrous, their edges beset with short cilia; straight portion of upper edge of fore femora serrated nearly to the apical end; the intermediate and hind femora have a triangular spine below at the apex; all the tibiæ have a foliaceous carina arising near the base and gradually subsiding towards the apex; the posterior ones have sometimes a triangular foliaceous spine near the base above; the intermediate ones sometimes one, two or none. Tarsi triquetrous; first joint of the anterior pair as long as the others taken together; in the other legs it is not nearly as long as the united lengths of the remaining joints.

Total length of the body 4 in. 8 lines, antennæ  $6\frac{1}{2}$ , head  $2\frac{1}{2}$ , proth. 2, mesoth. 11, metath. 8, abdomen  $27\frac{1}{2} + 5\frac{1}{2} = 33$ .

Abdomen : rest of body :: 1:40:12 : 1.

In the specimen described, the intermediate legs when stretched straight backwards, reach to the commencement of the posterior third of the fourth abdominal segment, the posterior legs to the *cerci anales*; in other specimens the intermediate legs extend rather beyond the fourth segment, and the posterior ones beyond the extremity of the abdomen.

*Hab.*—Nine adult and three immature females were captured by my



private collector during the months of August, September and October last in the neighbourhood of Port Blair on South Andaman. An immature insect collected by Mr. Homfray at Camorta, Nicobar Islands, differs so slightly from larvæ, beyond doubt belonging to the present species, that I hesitate to give it another name.

**BACILLUS (BACULUM) ARTEMIS, Westwood. Pl. VI. Figs. 1-2.**

*Bacillus? Artemis*, ♀, Westwood, Cat. of Orthopterous Insects in the British Mus., 1859, Pt. I, Phasmidæ, p. 10, pl. xxvi, fig. 9, 9a.

*B. patellifer*, Bates, ♀, Trans. Lin. Soc. London, 1865, Vol. xxv, Pt. I, p. 328.

Numerous specimens of an insect remarkably abundant in the moist, deep valleys of Sikkim, in Cachar, in the Bhutan Doars and at Samagooting in the Naga Hills, agree in every respect both with Bates' description of *B. patellifer* and with *Bacillus? Artemis* described and figured by Prof. Westwood from a dried and mutilated example now in the Hopeian collection at Oxford. The comparison of dried specimens in my possession with Westwood's figures shows that the compression of the three terminal segments is mainly, and that the depression and enlargement posteriorly of the sixth dorsal are entirely effects of drying. Bates omits to mention that the terminal dorsal segment is grooved above in the middle line, and that the emargination in its posterior border is occupied by a small carinated azygos plate with a rounded hinder margin; the state of preservation of Prof. Westwood's specimen may probably account for his omission to mention not only these points but even the emargination itself. The following are the dimensions of a specimen from the Naga Hills figured on plate vi.

Total length 4 in. 5 lines, ant. 7 lines (25-jointed), head  $2\frac{1}{2}$ , proth. 2, mesoth.  $10\frac{1}{2}$ , metath. 8, abd. 2 in.  $0\frac{1}{2}$  line + 6 = 2 in.  $6\frac{1}{2}$ .

A variety found in all the districts mentioned above with the exception of the Bhutan Doars is figured side by side with the typical form on the same plate as showing the value of the armature of the legs unsupported by other characters in making a species; almost every gradation from the extremely acanthophyllous and spinose condition of the legs there depicted to their almost completely unarmed condition in fig. 1 being to be met with. Fig. 2 a, 2 b, 2 c may represent the same parts of fig. 1.

**BACILLUS (BACULUM) INSIGNIS, n. sp. Pl. V. Figs. 1-2.**

♀ Extremely robust, greatly elongated, subcylindrical, convex. Head remarkably stout, conspicuously narrowed from the eyes to the base, the sides being almost straight, armed between the eyes with two stout-based, acuminate, forwardly-directed and incurved spines or horns, notched posteriorly in the middle. Antennæ 25-jointed; basal joint depressed, expanded, and carinated above. Mesothorax gradually attenuated from the

base forwards; metathorax of uniform width; both are marked above with a fine raised median line which is continued on to three or four of the basal segments of the abdomen.

The abdomen is attenuated from the base of its third segment to the extremity. The three terminal segments are compressed; the first of these is twice as long as the second; the second  $1\frac{1}{2}$  times as long as the last which is grooved above in the middle line and has its posterior margin divided into two rounded lobes by a narrow fissure filled by the median carina of a small azygos plate; the upper contour of this last segment meets that of the preceding at a very obtuse angle. The operculum extends about one line beyond the abdomen; its posterior half is greatly compressed, so much so at its sub-truncate extremity that its opposite inner faces are in complete contact. *Cerci* minute, conical, their tips alone projecting slightly between the posterior and middle thirds of the last abdominal segment.

Legs stout, triquetrous; upper and lower crests of fore femora inconspicuously serrate towards the base; the intermediate femora are curved, their upper margin forming the convex curvature, and below at the base present two conspicuous divergent foliaceous expansions with rounded free margins, one springing from each crest and a conical spine at the apex; the posterior femora are but feebly curved and exhibit but a faint indication of these foliaceous lobes, and have also a spine at the apex below; all four posterior femora appear to be regularly tricarinate above, owing to the very close approximation of their two upper crests. The intermediate tibiæ have a large foliaceous lobe like a tooth of a saw near the base above, which is much reduced or even absent in the posterior pair; all the tibiæ have a sharp, well-developed foliaceous carina, on their basal third below, which in the fore tibiæ traverses the whole length of the joint. The first tarsal joint in the fore-legs is hardly as long as the other joints taken together; in the other legs it is not nearly as long.

The intermediate legs if stretched backwards would reach only just beyond the apex of the third, the posterior ones to the apex of the sixth abdominal segment.

Total length of body 7 in.  $2\frac{1}{2}$  lines; antennæ  $8\frac{1}{2}$ ; head  $3\frac{1}{2}$ ; proth.  $2\frac{1}{2}$ ; mesoth.  $16\frac{1}{2}$ ; metath. 14; abd.  $40 + 9\frac{1}{2} + \text{operc. } 1 = 50\frac{1}{2}$ .

Abdomen: rest of body :: 1.3655 &c.: 1.

*Hab.*—Samagooting, Naga hills, Assam, (Captain Butler); Sikkim (Mr. Mandelli); and the valleys around Cherra Punji in the Khasi hills (Lieut. Bourne).

**BACILLUS (BACULUM) PENTHESILEA, n. sp. Pl. V. Fig. 5.**

♀ Elongate, stout, cylindrical, smooth, with a faint raised median line extending from the anterior extremity of the mesothorax nearly to tip of

the abdomen. Head not so stout as in the preceding species, armed between the eyes with two minute conical spinules or tubercles, its posterior margin presents 3 notches giving it the appearance of being bi-tuberculata, narrowed from the eyes to the base. Antennæ very slender, as long as the three terminal abdominal segments taken together, 30-jointed; first joint somewhat expanded; second minute, hardly longer than broad, followed by 28 filiform joints gradually increasing in length to the apical one. Mesothorax uniform in width except at the insertion of the legs where it is expanded. Metathorax broader than the mesothorax and expanded at each end.

Abdomen very long, attenuated from the base of the 5th segment; the three segments anterior to this are uniform in width and broadest of all, broader even than the basal segment which is just perceptibly concave at the sides; the 6th ventral has a rounded punctate callosity posteriorly; the ante-penultimate segment is as long as the two last taken together; the last is grooved above in the middle line, has its posterior angles pointed and rather deflexed than projecting outwards and its hinder margin subangularly emarginate, the emargination being filled by an azygos plate which is carinate, has its free margin straight and projecting beyond the acutely angular tips of the segment, and its postero-lateral angles rounded. Cerci tolerably salient, obtuse. Operculum subcompressed and carinate for nearly its posterior half, rounded but not compressed at the tip which barely reaches as far as the bottom of the emargination in the last segment.

Legs slender; anterior pair triquetrous; the two other pairs subtriquetrous, their upper crests being not nearly so closely approximated as in the preceding species. The intermediate legs, stretched straight backwards so as to be parallel with the long axis of the body, reach to the middle of the 4th, the posterior ones to that of the 7th segment. The anterior femora are denticulate to beyond the middle of their upper and lower crests; the four posterior pairs are devoid of spines or foliaceous lobes except at their apical ends below where there is a short denticulate elevation, all the tibiae have a lamellar carina arising and attaining its greatest development near the proximal end; and the distal halves of the four posterior ones are acutely spinulose on all edges. The first joint of the tarsus of the fore-legs is fully as long as, of the intermediate legs shorter than, of the posterior legs almost as long as, the remaining joints together; but the first tarsal joint of 1st legs is longer and slenderer than those of the 2nd and 3rd pairs.

Colour green with the prosternum, bases of all the legs, the stigmata, the spines on the head and the interval between them, and the apex of the abdomen blackish-brown.

Total length, 6 in.  $10\frac{1}{2}$  lines; antennæ, 9 lin.; head,  $3\frac{1}{4}$ ; proth.  $2\frac{1}{4}$ ; mesoth.  $15\frac{1}{2}$ ; metath.  $13\frac{1}{2}$ ; abdomen 3 in. 3 lin. + 9 lin. = 4 in.; ant. legs: femur 23 lin. + tibia 22 + tarsus  $6\frac{1}{2}$  = 4 in.  $3\frac{1}{2}$  lin.; inter. legs: f.  $17\frac{1}{2}$  + tib.

16 + t.  $4\frac{1}{2}$  = 3 in.  $2\frac{1}{2}$  lin.; post. legs: f. 20 + tib. 18 + tar. 5 = 3 in. 7 lines.

Abdomen: rest of the body: : 1:3012 &c.: 1.

*Hab.*—A single specimen was collected in the neighbourhood of Baxa, Bhután Doár, by Dr. Cameron.

**BACILLUS (BACULUM) FURCILLATUS, n. sp. Pl. V. Fig. 6.**

♀ Elongate, cylindrical, smooth. Head unarmed, narrowed from the eyes to the base, with three notches on its posterior margin. Antennæ long and fine, as long as the metanotum proper, or as the two basal segments of the abdomen together, 21-jointed; first joint depressed, not greatly expanded, strongly carinate above; second longer than broad, sub-cylindrical; rest filiform. Meso- and meta-notum with a most delicate median line in relief; the former is of uniform width throughout, the latter very slightly expanded posteriorly at the origin of the legs. Abdomen shorter in proportion to the rest of the body than in the two preceding species, cylindrical to the apex of its fifth segment; whence it becomes slightly compressed and attenuated to its furcate extremity. A small azygos plate carinated above and with its posterior margin rounded, fills the bottom of the interval between the arms of the fork, which conceal its sides from view from above. The operculum is boat-shaped; its extremity which is rounded and slightly spread out horizontally, attains the level of the bottom of the fork only.

The legs closely resemble those of *B. Penthesilea*, but the four posterior femora have some widely-placed spinules on both their inferior crests; the intermediate ones reach to the end of the basal third of the 5th, the posterior extend slight beyond the terminal abdominal segment.

Total length 5 in.  $1\frac{1}{2}$  lin.: antennæ 8; head 3; proth.  $2\frac{1}{2}$ ; mesoth.  $12\frac{1}{2}$ ; metath. 10; abd.  $27\frac{1}{2}$  +  $6\frac{1}{2}$  =  $33\frac{1}{2}$ ; ant. legs, 3 in. 7 lin.; inter. legs, 2 in. 6 lin.; post. legs 2 in. 11 lin. Colour uniform green.

The abdomen: rest of body: : 1:2162 &c.: 1.

*Hab.*—Baxa, Bhután Doár, collected by Dr. Cameron.

This species is at once distinguished from the two preceding, as indeed these are from one another, by the difference in the structure of the terminal dorsal segment; by the form of the operculum, by the relative length of the abdomen to that of the body, and by the absence of spines from the head.

In the four preceding species to which M. de Saussure's subgeneric term *Baculum* may be provisionally applied, the last dorsal segment of the abdomen is mesially grooved above; the line of structural weakness thus produced, may possibly subserve the purpose of giving greater expansibility to the segment during copulation and oviposition. This peculiarity of structure is present also in *Bacillus (Baculum) Cuniculus*, Westwood, in *B. (B.) Hyphæron*, Westwood, and in *B. (B.)*

*scytale*, Bates, if one may judge from the published figures of those species. With regard to the last mentioned, it should be noted that Mr. Bates, although he states its affinities to be with the first, at the same time refers it to a totally distinct subgeneric group, *viz.*, to *Ramulus*, de Sauss., in which the abdomen is fusiform and acuminate at the extremity. It is also to be remarked that the species to which *B. scytale* is said to be so nearly related by Bates has turned out not to be a *Bacillus* at all, but a *Lonchodes* very closely allied indeed to *L. pseudoporus*, Westw., if not identical with that species. *Ramulus* is, however, still retained by M. de Saussure for a group of the *Bacilli*, under which *B. humilis*, Westw., *B. carinulatus*, Sauss., &c., have been arranged.

BACILLUS SCABRIUSCULUS, n. sp. Pl. VII. Fig. 1.

Very robust. The integument is wrinkled and studded with granulations and small tubercles. Head thick, coarsely granulated, very little narrowed behind, armed between the eyes with two conical spines, projecting outwards and slightly backwards and with their bases united by a transverse elevation, bi-tuberculate posteriorly. Antennæ as long as the metathorax, 18-jointed, ciliated; the first is depressed and expanded, and strongly carinated; the second joint is about half the length of the first, twice as long as broad and depressed; the rest are slenderer than it and filiform. Prothorax narrower in front, with its anterior margin hollowed for the reception of the head, covered with coarse granules. Meso- and meta-notum irregularly wrinkled longitudinally and covered with small tubercles or coarse granules, marked with a raised median line; the former gradually widens from the apex to the insertion of the intermediate legs; the latter is broader and of uniform width, and a distinct suture divides it into an anterior posterior division (the true 1st abdominal segment = *segment mediore*). Below, the granulations and wrinkles are finer. The abdomen is cylindrical to the fifth or sixth segment, whence it becomes suddenly contracted and compressed, but expands again slightly at the apex which is furcate; the bottom of the fork is occupied by a small carinated azygos plate. The upper contour of the three terminal dorsal segments is extremely convex and the posterior margin of the first two of them is produced into a small process. The operculum is lanceolate in outline as seen from below, its posterior half is carinate and its apex barely reaches the level of the minute *cerci*.

Legs long; anterior pair triquetrous, the rest prismatic; anterior femora serrated to the middle of the upper crest; the intermediate ones are armed with three conspicuous dentate foliaceous lobes above and with three small spines on the other crest, one opposite to each of the foliaceous lobes; the posterior femora have some small spines on each of their upper crests. The

intermediate tibiæ have each two small foliaceous lobes above at the proximal end and immediately opposite to these, below, a single spine; at their distal ends all their edges are spinulose; the posterior tibiæ have two minute spines above at the proximal end and their distal ends are similarly spinulose. All the legs are shortly-ciliate, especially at the extremities.

Total length 4 in.  $1\frac{1}{2}$  lines; antennæ  $7\frac{1}{2}$ ; head  $3\frac{1}{2}$ ; proth.  $2\frac{1}{2}$ , mesoth.  $10\frac{1}{2}$ ; metath.  $7\frac{1}{2}$ ; abdomen  $18\frac{1}{2} + 7 = 25\frac{1}{2}$  lines.

*Hab.*—Naga Hills, Assam. A single specimen was collected by Captain Butler.

### Explanation of Plates.

#### Plate V.

Fig. 1. *Bacillus (Buculum) insignis*, ♀, nat. size. 1a, the head seen sideways; 1b, the extremity of the abdomen seen sideways.

Fig. 2. Upper view of terminal abdominal segment of *B. insignis*, ♀, enlarged.

Fig. 3. *B. oxytenes*, ♀, nat. size; 2a, extremity of the abdomen from the side.

Fig. 4. *Bacillus lævigatus*, ♀, nat. size; 4a, b, c, represent same parts as in the previous figures.

Fig. 5. Upper view of terminal abdomen segment of *B. Penthesilea* ♀, enlarged; 5a, side-view of three terminal segments, nat. size.

Fig. 6. *B. furcillatus*, ♀, terminal segment of the abdomen from above, enlarged; 6a, the three terminal segments nat. size seen sideways.

Fig. 7. *B. fuscolineatus*, ♂, nat. size; 7a, the three terminal segments of the body seen from above; 7b, the same seen from the side.

#### Plate VI.

Fig. 1. *Bacillus Artemis*, Westw. ♀, nat. size.

Fig. 2. *Bacillus Artemis*, Westwood ♀, var. nat. size; 2a, the three terminal segments seen from the side; 2b, the terminal segment,  $\times 2$  from above, 2c, the extremity of the abdomen from below, 2d, basal joint of antennæ magnified.

Fig. 3. *B. Westwoodii*, ♀, nat. size; 3a, side view of three terminal segments of abdomen; 3b, the same from below.

#### Plate VII.

Fig. 1. *Bacillus scabriusculus*, ♀; nat. size; 1a, the three terminal segments of the abdomen from the side.

Fig. 2. *Bacillus hispidulus*, ♂, nat. size; 2a, the terminal segments of the abdomen seen sideways; 2b, the same seen from above; 2c, the same from beneath.

Fig. 3. *Bacillus hispidulus*, ♀, nat. size; 3a, 3b, 3c, represent same parts as in fig. 2.

ON AN UNDESCRIBED SPECIES OF *LOPHOPHANES*, by W. E. BROOKS, C. E.,  
Assensole.

[Received 11th February, 1873 ; read 5th March, 1873.]

*LOPHOPHANES HUMEI*, n. sp.

*Description.* Head and crest, neck, chin and throat, bluish black ; the black of the throat extends about 0·6 of an inch from base of lower mandible ; cheeks and ear coverts, and sides of the neck beyond ear coverts, form a patch of pure white ; there is also a large patch of pure white on the back of the neck ; on the sides of the neck below the white patch the black extends about  $\frac{1}{2}$  of an inch lower down than it does on the centre of the breast ; back and wing coverts dark bluish grey, becoming paler and more ash coloured on the upper tail coverts ; lesser and greater wing coverts tipped with bright white ; wings and tail dusky, the feathers having paler edges ; wing lining, axillaries and breast a clear ochre passing to a dusky yellow grey on the flanks, lower abdomen, and under tail coverts. This fulvous lower surface is characteristic of the species. Bill black ; legs and feet dusky.

\* Total length judging from the skins, will be about 4 inches.

| No. | Length of skin. | Wing. | Tail. | Bill at front. | Tarsus. | Middle toe and claw. | Hind toe and claw. |
|-----|-----------------|-------|-------|----------------|---------|----------------------|--------------------|
| 1—  | 3·7             | 2·25  | 1·76  | ·32            | ·68     | ·5                   | ·48                |
| 2—  | 3·5             | 2·12  | 1·73  | ·3             | ·66     | ·5                   | ·5                 |

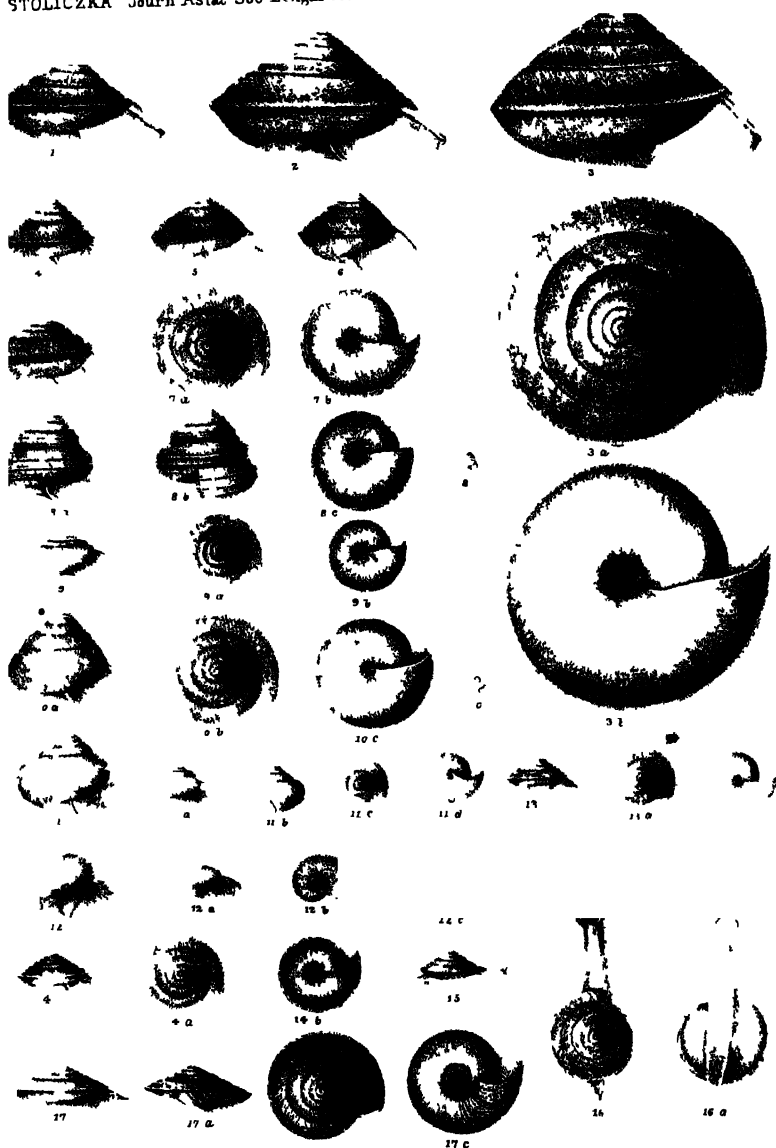
This species strikingly resembles in colouration the plate of *Parus Britannicus*, Sharpe and Dresser, in their fine work on the Birds of Europe ; except that it is almost devoid of the greenish tint of the upper parts shewn in the plate, and our species is not a typical *Parus*, but a crested *Lophophanes*. It is also rather like Hodgson's drawing of *Parus oemodius* ; but that species is not shewn to be crested, neither has it any white spots on the wings.

I picked this species out of a collection of Sikkim birds, sent by Mr. Mandelli to Mr. Ball. The discoverer allows me to describe it, and I have, therefore, great pleasure in naming it after my friend Mr. Hume, as I cannot remember any species named after the most laborious of our present Indian Ornithologists.









Figs 1 3 *Rhyssota cymatium*

4 7 *Retula byuga*

8 *Sitala carinifera*

9 *Macrochlamys staphyloides*

10 *Microcyctis palmicola*

Fig 11 *Kakacarium permolle*

12 *Vitrina nucleata*

13 *Trochom. Carriariana*

14 16 *Castra*

17 *Timorrensis*

For further explanation see p 37





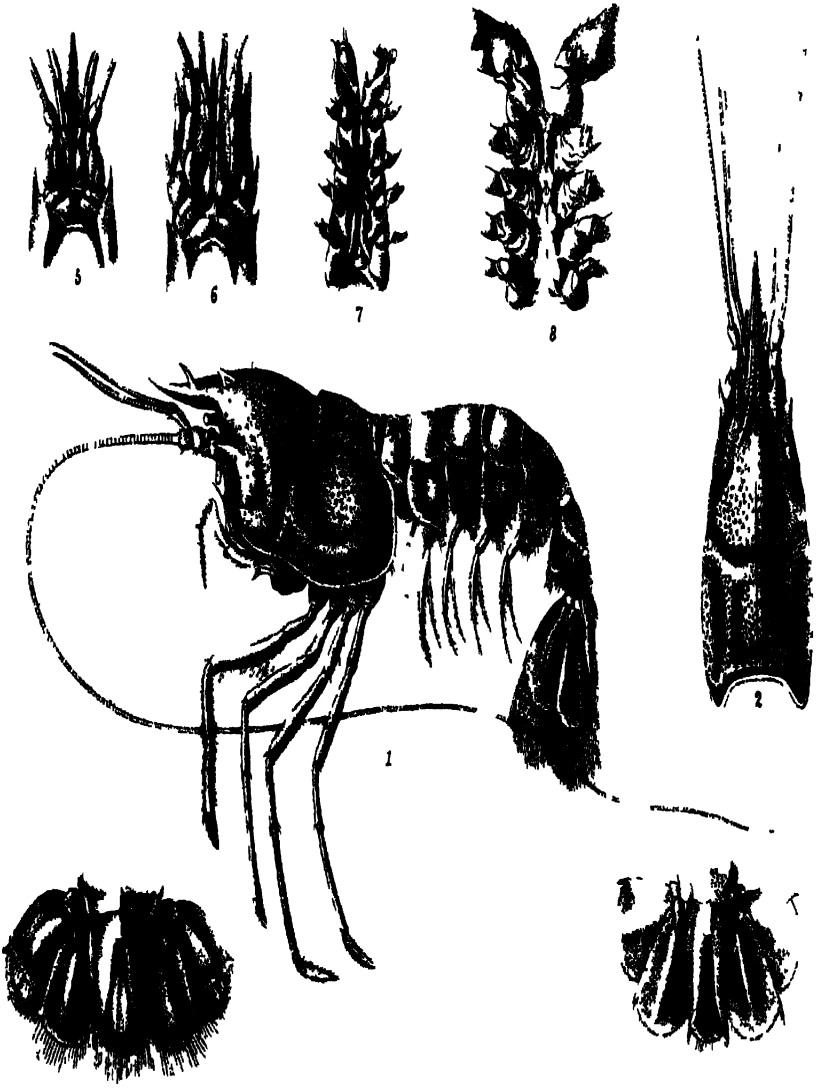




Fig 1 18.20 *Trachia Penangensis* p 24  
2 *Tupa orcella* p 33  
3 *palmura* p 32

4 6, 15 17 *Clausilia Penangensis*, p 27  
7-8 *Clausilia Alcockiana*, p 28  
9 14 *Phalomyces pictus* p 30





*Nephropsis Stewarti* (see p 44)





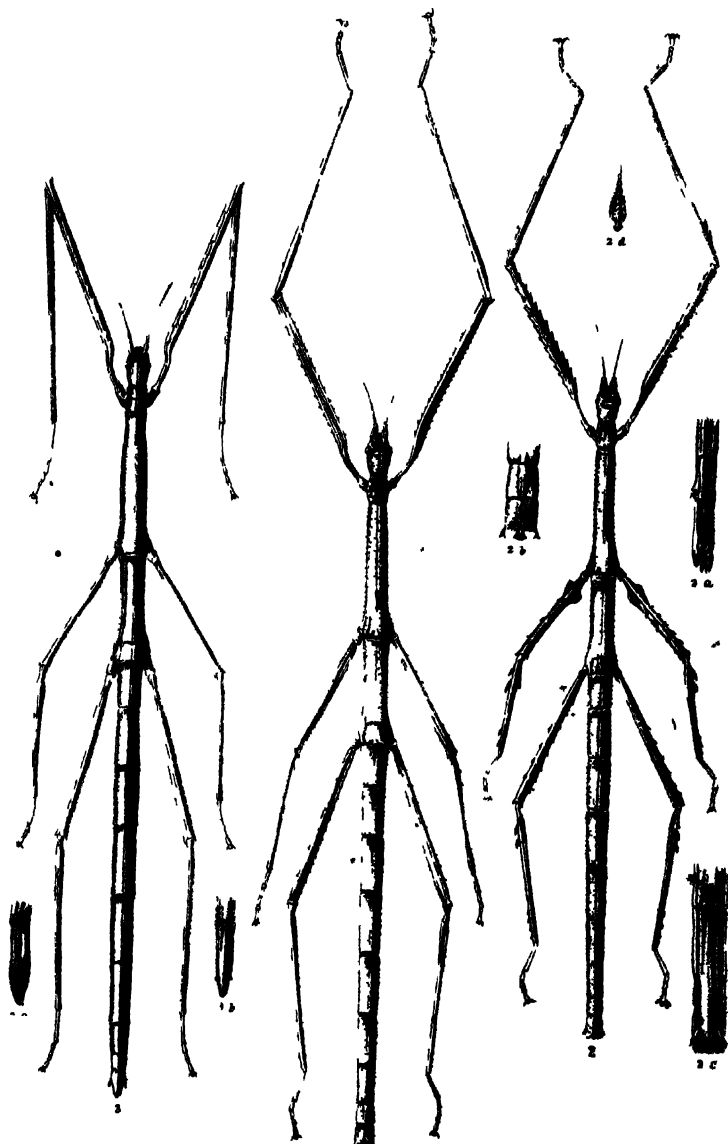


Fig 1-2 B Ariemae p 51 Fig 3 B Westwoodia, p 50



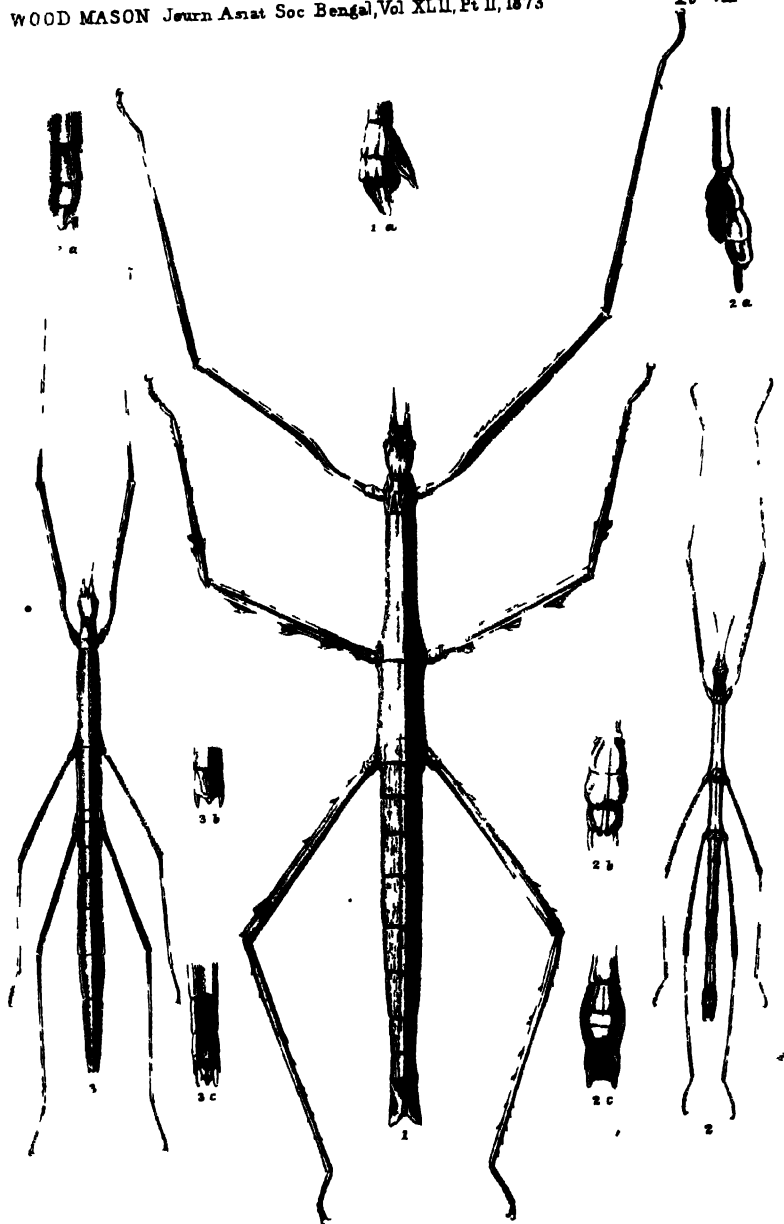


Fig 1 *B. scabrisculus*, p 55 Fig 2-3 *B. inspidulus*, p 47  
For further explanation see p 56.



# JOURNAL OF THE ASIATIC SOCIETY.

## Part II.—PHYSICAL SCIENCE.

No. II.—1873.

NEW BURMESE PLANTS. PART II,—by S. KURZ, Esq

[Received 15th Feb., read 5th March, 1873.]

[With plates VIII, IX, X.]

### *TERNSTROEMIIACEÆ.*

#### 106 *ANNESLEA MONTECOLA*, nov. sp.

Arbor 80-90 pedalis v. in regionibus altioribus pumila, glaberrima; folia c. 3 (arboris juvenilis usque ad 7) poll. longa, ovato-oblonga, raro lanceolata, basi rotundata v. obtusa et subdecurrentia, breve lateque petiolata, acuminata v. acuta, integra v. obsolete crenata, crassissime coriacea, nervis vix visibilibus, subtus (in sicco) atropunctata; flores majusculi, basi bibracteolati, pedicellis 2, sub fructu usque 3 poll. longis crassis albis ramulos terminantibus, calyx coriaceus, albus; corolla rosea. *Martaban*.—*A. crassipedi* arcte affinis, pedunculis et foliis acutis distinguitur.

#### 107. *SAURAUJA ARMATA*, nov. sp.

Arbor 25-30 pedalis, novellis squamis adpressis firmis subossibus acutissimis vestita; folia 9-10 pollicaria, lato-ovata ad obovato-oblonga, acuta, basi obtusa, brevissime petiolata (petiolis crassis squamatis), spinescenti serrata, chartacea, glabra, sed subtus secus costam nervosque squamis subossibus adpressis adpersa; flores  $1\frac{1}{2}$  poll. fere in diametro, in pedunculis brevissimis crassis dense squamatis solitarii, vulgo supra foliorum delapsorum cicatricibus fasciculati; sepala tomento squamis rigidis adpressis intermixta obducta; ovarium unacum parte unita stylorum 5 dense villosum. *Martaban*.

## 108. SAURAUJA MACROTRICHA, nov. sp.

Partes omnes (superficie foliorum excepta) pilis longis rigidis ferrugineis v. nigrescentibus vestitæ; folia fere pedem longa v. breviora, lanceolata, utrinque attenuata, breviuscule petiolata (petiolis hireutis), acuminatissima, setaceo-serrata, chartacea, supra glabra, subtus inprimis secus nervos venulosque rigide hirsuta; flores parvi, longe graciliterque pedicellati, in axillis foliorum v. supra eorum cicatricibus cymas hirsutas formantes; bracteæ parvæ, lineari-lanceolatæ, glabræ; sepala et ovarium glabra; styli 5, erecti, basi uniti.—*Ava.* (J. Anderson.)

## 109. PYRENARIA DIOSPYRICARPA, nov. sp.

Arbuscula novellis tomentellis; folia 4-5 poll. longa, oblongo-v. elliptico-lanceolata, basi acuta et marginibus ut plurimum involutis, breve petiolata (petiolis crassis dense tomentosis), obtusa v. subobtusa, coriacea, juniora utrinque, denuo subtus tantum dense tomentella v. pubescentia, flavescenti viridia, in siccio more *Symploci* lutescentia; flores mediocres, brevissime et crasse pedicellati, solitarii, axillares; bracteæ sepalis longiores, foliaceæ, oblongo-lanceolatæ, basin versus attenuatæ et cum basi latissima sessiles; sepala bracteis conformia, sed minora et gradatim in petala extus denso sericea abeuntia; ovarium denso sericeo-villosum; styli 5, apice liberi, crassi et breves; drupæ pomiformes, 2 poll. circiter longæ, obovato-oblongæ, obsolete obtusæque 3-4-angularcs, carnosæ, lævissimæ et cerino-luteæ, nitentes, basi *Diospyrorum* more bracteis sepalisque paullulo accretis sustentæ.—*Martaban.*

## DIPTEROCARPEÆ.

110. SHOREA FLORIBUNDA (*Hopea floribunda*, Wall. Cat. 964).

Arbor verosimiliter decidua, glaberrima; folia juniora oblonga ad elliptica, basi rotundata, petiolis mediocribus gracilibus suffulta, acuta, glabra; flores mediocres, subsessiles, racemosi, in paniculas glaberrimas in axillis foliorum novellorum dispositi; calycis lævissimi lobi 2 interiores paullo breviores; petala semipollicem fere longa, lutescentia?, lanceolata, extus parco pubescentia; stamina c. 15, connectivo in aristam reflexam antheræ longitudine terminato.—*Tenasserim.* (Wall.).

## 111. HOPEA GRIFFITHII, nov. sp.

Glabra; folia ovato-lanceolata, breviuscule sed gracilius petiolata, basi acuta, longe et obtusiuscule caudato-acuminata, coriacea, subtus subnitentia et costa acute prominente percursa, nervis autem lateralibus 12-10 utrinque subtilibus; flores minimi, subsessiles, secundi, flexuoso racemosi, paniculam glabram brevem sed gracillimam formantes; calyx glaber, lobis lato-rotundatis et obtusis; petala extus velutina, lineam circiter longa; antheræ breves arista rigida antheræ longitudine v. longiore terminatæ.—*Tenasserim* (Helf. 717).

*H. jucundæ*, Thw. arcte affinis a qua autem foliorum-nervatione valde diversa jam dudum recognoscenda.

112. *HOPEA GRATISSIMA*, Wall. Cat. 960.

Glabra; folia lato-lanceolata, graciliter petiolata, basi acuta, breve et obtusiuscule apiculata, coriacea, supra lucida, nervis 15-16 utrinque subparallelis unacum costa acute prominentibus: flores secundi, breve pedicellati, racemos compositas terminales axillaresque parce puberulos formantes; calyx velutinus, lobis lanceolatis obtusis; petala extus velutina, 2 lin. longa; connectivum arista longa flexuosa terminatum.—*Tenasserim*. *H. diversifolia*, Miq., quam maxime affinis, an synonyma?

113. *ANISOPTERA GLABRA*, nov. sp.

Arbor ingens, 100-120 pedalis, glabra; folia circ. 5 poll. longa, elliptica ad oblonga, raro obovato-oblonga, breve acuminata, basi rotundata v. obtusa, coriacea, utrinque glabra, nervis subtus valde prominentibus; petiol. 1—1½ poll. longi, glabri; racemorum pedunculi ferrugineo-tomentosi, glabrescentes; flores desunt; calycis tubus fructigerus glaber, nuci tomentosæ fero ad 2/3 part. adnatus; calycis laciniae inequales, quarum 2 longiores c. 6 pollicares, lineari-lanceolatae, obtusae, basim versus sensim attenuatae, conspicue 3-costatae et transverse venosae, glabrae (costis minute tomentosis exceptis); interiores 3 strictae, erectae, lineari-lanceolatae, pollicem fere longae acuminatae, basin versus latiores; nux velutina stylo longo acuminata.—*Martaban*. *A. marginata*, Korth., cui *Shoream Penangianam*, Wall. Cat. 963, synonymam adscriberem, affinis.

*MALVACEÆ.*

114. *BOMBAX INSIGNIS*, Wall. Pl. As. rar. I. 71. t. 79-80.

Species haud cum *B. Malabarica* conjungenda, sed inter alia staminibus bene distinguitur:

*B. Malabarica*: staminum phalanges c filamentis crassis 15-20; *B. insignis*, autem c filamentis 50 pluribusve filiformibus compositæ.

*STERCULIACEÆ.*

115. *HERITIERA MACROPHYLLA*, Wall. MS.

Arbor, omnibus partibus argenteo-lepidotis; folia magna, ovato-oblonga v. oblonga, petiolis parce lepidotis 2-4 poll. longis v. raro brevioribus, basi rotundata et sæpius leviter sinuata, 7-12 poll. longa, acuta v. breve acuminata, coriacea, supra glabra, subtus argenteo-lepidota; flores parvi, dense fulvo-puberuli, 5-raro 7-denticulata, breve pedicellati paniculas axillares amplas ramosas dense fulvo-puberulos formantes; carpella lignosa, suboblique ovalia, canescenti-lepidota et pustulis suberosis rugoso-scabra, facie interna conspicue, extus obsolete carinata, apice in appendicem longiusculum coriaceum

alaeformem producta.—*Martaban*. N. B. H. *attenuata*, Wall., Cat. 1140 ; Horsf. et Benn. H. Jav. rar. 237, a me non visa, vix hujus generis sed probabiliter cum *Brownlowia lanceolata*, Bth., comparanda.

116. *HELICTERES OBTUSA*, Wall. Cat. 1184.

Fruticulus partibus omnibus fulvo-tomentellis ; folia oblonga ad oblongo-lanceolata, brevissime petiolata, basi obtusa v. rotundata ibidemque 3-nervia, 2-2½ poll. longa, in eademque stirpe obtusa v. acuta et vulgo mucronata, chartacea, integra, supra pilis brevibus stellatis adspersa, subtus fulvescenti stellato-tomentella ; flores parvi, breve pedicellati ; cymæ fulvo-tomentellæ, brevissimæ, axillares, paucifloræ, graciles ; calyx circ. 2 lin. longus, stellato-tomentellus et subfurfuraceus ; petala sublongiora ; staminum columna glabra ; capsulæ oblongæ, breves, circ. 7-8 lin. longæ, dense villosomuricatæ, carpellis inter se arcte coherentibus obtusis v. subobtusis.—*Martaban, Tenasserim*. *H. lanceolata*, DC. (= *H. virgata*, Wall.) affinis.

117. *PTEROSPERMUM ACEROIDES*, Wall. Cat. 1171.

Arbor, novellis dense tomentosis ; folia elliptica v. lato-oblonga, utplurimum subobliqua, arboris junioris palmato-5-7-loba, breviuscule petiolata, profunde et saepius inaequali-cordata, verosimiliter nunquam peltata, breve acuminata v. apiculata, supra glabra, subtus canescenti v. fulvescenti-tomentosa, basi 5-7-nervia ; stipulæ... ; flores magni, albi, breve crasseque pedicellati, 3-v. 2-ni axillares et subcymosi ; bracteolæ oblongo-lanceolata, tomentosæ, integræ ; calyx 2-3 poll. longus, sepala crassissime coriacea, linearia, ferrugineo-tomentosa, extus striata, intus fulvo-stellato pubescentia ; stylus glaber ; ovarium fulvescenti-tomentosum ; capsulæ 5-angulares, oblongæ.—*Tenasserim, Andamans*.

*TILIACEÆ.*

118. *BERRYA MOLLEIS*, Wall. Cat. 1186.

Arbor magna, novellis tomentellis ; folia cordato-rotundata, lata, circ. 6-7 poll. longa et lata, basi palmato-7-9-nervia, petiolata, petiolis 4-5 poll. longis dense puberulis v. tomentellis, obtusiuscula v. acuta, obsolete repanda et in lobos 2-3 breves obtusos producta, chartacea, adulta supra (nervis pubescentibus exceptis) glabra, subtus dense puberula v. subtomentosa ; flores c. 4-5 lin. in diametro, albi, paniculas laxas fulvo-tomentosas terminales formantes ; pedicelli longi, tomentosi ; calyx extus dense tomentosus, profunde 2-3-fidus, in alabastro subglobosus ; petala obovato-lanceolata, calyce longiora ; stamina numerosissima et conferta ; stylus simplex, glaber ; ovarium villosum ; capsulæ unacum alis oblique oblongis nervosis c. 2-2½ poll. in diametro, tomentellæ, siccæ, brunneæ ; semina globosa.—*Pegu, Martaban*.



119. *GREWIA SCABRIDA*, Wall. Cat. 1113 (pro parte).

Frutex ? novellis ferrugineo-tomentellis ; folia oblonga v. ovato-lanceolata, 5-6 poll. longa, petiolis brevibus ferrugineo-tomentosis, basi obtusa v. rotundata, serrata, acuminata, chartacea, utrinque (præsertim subtus) stellato-hirta et scabra, 3-nervia, venis transversis valde conspicuis ; flores circ. 8-10 lin. longi, pedicellis sulcatis ferrugineo-tomentosis et subfurfuraceis, 2-3-ni cymas parvas ferrugineo-tomentosas axillares formantes ; sepala 7-8 lin. longa, lineari-lanceolata, extus scabriusculo ferrugineo-tomentella ; petala circ. 2 lin. longa, lamina oblongo-lanceolata obtusa et a foveolâ latâ crassâ dense fulvo-villosâ usque ad basin fere separabilis ; gynophorum et ovarium fulvo-villoso ; drupæ profunde 4-lobæ, sed sæpe loborum unus alterve abortivus, lobis obtusis et divergentibus parce hispidis glabrescentibus, pollicem fere in diametro ; mesocarpium fibrosum, coccis monospermis.—*Martaban, Tenasserim.* Species *G. odoratæ*, Bl. (*G. umbellata*, Roxb.) et *G. columnari*, Sm. valde affinis, sub eodem nomine cum *G. pilosa*, Lamk., a cl. Wallichio distributa indeque a Wightio et Arnotto cum eadem confusa. *G. retusifolia*, Kurz in hocce diario, 1872, p. 294 proposita, foliis profunde retusis in sinu mucronatis insignis, teste cl. Mastersio ad *G. humilem*, Wall., speciem nondum descriptam, pertinet.

120. *GREWIA MICROSTEMMA*, Wall. ap. Voigt. Cat. Hort. Suburb. Calcutt. 128.

Frutex novellis scabro-puberulis ; folia oblonga v. ovato-lanceolata, basi inequali-rotundata, brevissime petiolata, 5-7 poll. longa, acuminata, duplicato-serrato-dentata, chartacea, utrinque (præsertim subtus) scabro-puberula, 3-nervia, cum nervo adjecto ad latus latius ; stipulæ petiolis fulvo-tomentosis longiores, subulatae, strictæ, scabro-puberulæ ; flores parvi ; pedicelli tomentosi, breves ; cymæ multifloræ brevissime pedunculatæ 2-3-næ axillares ; sepala circ. 2 lin. longa, fulvo-puberula ; petala lineari-lanceolata, 1 lin. longa, longitudine foveolæ ovalis villosa-ciliatæ incrassatæ, dorso linea hirsuta notata ; stamina in floribus masculis 16 ; ovarium hirsutum ; drupæ...—*Pegu.*

121. *COLUMBIA FLORIBUNDA*, (*Grewia floribunda*, Wall. ap. Voigt. Cat. Hort. Suburb. Calc. 128 ; *Glossospermum* ? 5-alatum, Wall. Cat. 1154 et 7841).

Frutex scabro-stellato-hirtellus ; folia rotundata v. lato-obovato-oblonga, basi vulgo cordata, petiolis longiusculis gracilibus scabris, acuta v. breve acuminata v. obtusa, apicem versus sæpius in lobos 2 v. unicum obtusum v. truncatum raro acutum producta, distanter dentata, basi vulgo 7-nervia, membranacea, supra stellato-scaberrima, subtus plus minus pilis stellatis puberula et mox scabrescentia ; flores parvi, pedicellis gracilibus brevibus

tomentellis, in cymulas pedunculatas dispositi et paniculam terminalem laxam canescenti-puberulam efficientes; sepala lineam circiter longa, extus canescenti-tomentella; petala obovato-oblonga, obtusa, sepalis subæquilonga, basi foveola minuta incrassata villosa-ciliata aucta; capsulæ 7-9 lin. in diametro, stellato-puberulæ, scabræ, siccæ, maturæ in carpidia 3-4 indehiscentia monosperma bialata separantes.—*Ava, Martaban.*

122. *EVODIA VITICINA*, Wall. Cat. 1219.

Frutex? glaber, ramulis lineis 4 acute prominentibus notatis; folia 3-v. uni-foliolata in eodem v. diversis ramulis, opposita, glabra, petiolis  $\frac{1}{2}$ — $\frac{3}{4}$  poll. leviter alatis; foliola 2-3 $\frac{1}{2}$  poll. longa, lanceolata v. obovato-lanceolata, basi attenuata et subsessilia, membranacea, breve acuminata, subtus pallida; paniculæ contractæ et parvæ, puberulæ, petiolis v. multo breviores v. subæquilongæ; flores parvi, brevissime pedicellati; petala 4, lineari-oblonga, obtusa, subcoriacea; carpella....—*Tenasserim.*

123. *LIMONIA ALTERNIFOLIA*, Wall. ap. Voigt. Hort. Calcutt. 139.

Fruticulus gracilis, simplex v. parce ramosus, deciduus, inermis, glaber-rimus; folia impari pinnata, rachide anguste alata; foliola 5-7-juga cum impari, alterna, subsessilia, oblongo-lanceolata ad lanceolata, oblique acuminata, crenata, glabra, 1-1 $\frac{1}{2}$  poll. longa, pellucido-punctata; flores pentameri, parvi, albi, e ramulis novellis axillaribus brevibus orientes et cymam brevem glabram breve pedunculatam v. subsessilem efformantes; calycis lobi trigono-oblongi, acuta,  $\frac{1}{2}$  lin. longi; petala 3 lin. longa, acutiuscula; stamina 10, alternatim breviora, filamenta basi intus parce puberula; ovarium obovatum, compressiusculum, læve, toro brevi crasso insidens, 2-loculare, loculis ovulo solitario pendulo; stylus curvus, stigmate incrassato; torus post præflorationem productus; baccæ....—*Pegu.*

*SIMARUBEÆ.*

124. *BRUCEA MOLLIS*, Wall. MS.

Fruticulus simplex v. subsimplex, 2-3 pedalis, novellis puberulis v. pubescentibus; folia imparipinnata, petiolus rachisque teres puberuli, glabrescentes; foliola 4-6-juga cum impari, ovato-oblonga v. ovato-lanceolata, longiuscule petiolulata, acuminata, integerrima, membranacea, supra sparse, subtus densius, pubescentia v. præter nervos pubescentes glabra, 2-3 poll. longa; flores minuti, graciliter pedicellati, racemos puberulos v. pubescentes simplices graciles folio multo breviores axillares formantes; drupæ solitariae v. binæ, rarius ternæ, ovatæ, pisi majoris magnitudine v. majores.—*Martaban.* *Brucea* genus magis ad *Tapirium* inter *Anacardiaceas* spectat.

*MELIACEÆ.*

125. *CHICKIRASSIA VELUTINA*, (Swietenia velutina et S. villosa, Wall. Cat.).

Species mihi bona, a Ch. tabulari distinguitur novellis, foliis etc. molli-ter pubescentibus, foliolis numerosioribus supra velutinis subtus molliter pubescentibus; paniculis ferrugineo-tomentosis; floribus majoribus; petalis obovato-oblongis 5-6 lin. longis; calyce dense fulvo-tomentoso; capsulis atris, sublævibus.—*Pegu*, etc.

*CELASTRINEÆ.*

126. *MICROTROPIS LONGIFOLIA*, Wall. Cat. 4339 (pro parte).

Frutex? glaber; folia oblongo-lanceolata v. oblonga, petiolis crassis 4-5 lin. longis, breve acuminata, basi acuta, 6-7 poll. longa, integra, coriacea, utrinque (præsertim supra) rugulosa, opaca; flores breve cymosi; pedunculus 4-6 lin. longus; capsulæ obovatæ; testa seminis rubra.—*Tenasserim*. *G. latifolia*, Gais., in Hb. Kew assimilis, nervatione autem diversa.

*AMPELIDEÆ.*

127. *LEEÆ COMPACTIFLORA*, nov. sp.

Arbuscula *L. sambucinae* valde affinis, sed foliola angustiora, argute serrato-dentata, longe acuminata; inflorescentia petiolo multo brevior, ferrugineo-tomentosa; flores viridiusculi, sessiles, bracteis latis brevibus ovatis acutis subscariosis circumdati et in glomerulos compactos congesti; fructus non adsunt.—*Martaban*.

128. *LEEÆ GIGANTEA*, Griff. Not. Dicot. 697. t. 645, f. 3.

Frutex simplex, elatus, glaberrimus; folia largissima, supra-decomposita, petiolus compressiusculus lævis; foliola vulgo magna, 6-8 poll. longa, petiolulis  $\frac{1}{2}$  (terminali usque ad 2) poll. longis, oblonga ad oblongo-lanceolata, breve et abrupte acuminata, basi acuta, grosse crenato-serrata, tenuicoriacea, glaberrima, lucida, siccando nigrescentia, nervis subtus prominentibus; flores parviusculi, virescenti-albidi, pedicellis brevissimis robustis v. subsessiles, in cymam amplam diffusam 2-3-chotomice ramosam glaberrimam axillarem v. subterminalem petiolorum longitudine v. longiorem dispositi; bracteæ bracteolæque ante anthesin caducissimæ; calycis lobi breves, rotundati v. subacuti, glabri; petala reflexa, lincam circiter longa; lobi tubi staminum triangulari-lanceolati, acuminati, apice integro reflexi; baccæ depressæ-globosæ, 4-6 spermæ; semina obtuse carinata, lateribus tuberculato-costatis.—*Tenasserim*.

129. *LEEÆ LETA*, Wall. Cat. 6831.

Frutex humilis, 2-3 pedalis, glaber; folia bipinnata, petiolis teretibus; foliola petiolulis 1-2 lin. longis, oblongo-ad ovato-lanceolata, 5-8 poll. longa,

basi rotundata subinequalia, acuminata, crenato-serrata, membranacea, glabra siccando magis minusve rubescentia; flores parvi, rubri, pedicellis brevibus tomentosis, cymas compositas breves sessiles v. pedunculatas compactiusculas v. raro diffusas axillares efficientes; bracteæ bracteolæque ante anthesin caduæ; calycis lobi triangulares, acuti, glabri; petala lineam fere longa; tubi staminei lobi emarginati; baccæ desunt.—*Burma, Andamans.*

130. *LEEAE SANGUINEA*, Wall. ap. Voigt. Cat. Suburb. Calcutt. 30.

Herba perennis, caulibus crassis teretiusculis, glabra; folia inferiora decomposita, superiora impari-pinnata, summa sæpius ternata, petiolis, petioulis rachique anguste membranaceo-4-alatis; foliola vulgo 3-juga cum impari, elliptico-oblonga ad oblongo-lanceolata, terminali longius petiolulato sæpius ovato-oblongo, brevissime petiolulata v. subsessilia, 6-8 poll. longa, acuta, argute serrata, glabra, nervis parallelis venisque transversis subtus valde prominentibus; cymæ vulgo a basi ramosæ v. pedunculatæ, trichotomo-ramosæ, pedunculis et ramificationibus purpurascensibus compresso-angulatis glabris; bracteæ, bracteolæque ante anthesin deciduæ; flores parvi, coccinei, pedicellis brevibus crassis glabris suffulti; calyx 5-dentatus, coccineus, lobis acutis; petala coccinea, lineam circiter longa; tubus stamineus cerino-albus, lobis emarginatis; filamenta subpurpurascens; baccæ depresso-globosæ, pisi magnitudinis, vulgo 6-spermae, aurantiacæ.—*Ava.*

N. B.—*Vitis Wallichii*, Kurz in hocce diario 1872, p. 302 (*Leea cordata*, Wall. Cat. 6819) ad *V. Linnæi* formas probabiliter reducenda, a quibus autem cymis axillaribus (nec oppositifoliis) differre videtur.

### *ANACARDIACEÆ.*

131. *MANGIFERA CALONEURA*, nov. sp.

Arbor mediocris, glabra; folia oblonga ad oblongo-lanceolata, 3-5 pollicaria, petiolo basi valde incrassato 1-½ poll. suffulta, obtuse acuminata, coriacea, glabra, utrinque elegantissime minute et prominenter reticulata, costâ crassa lata præsertim supra prominente et subplana percursa, nervis lateralibus vix curvis 18-20, tenuibus; flores parvi, sessiles v. subsessiles paniculam terminalem tomentosam amplam formantes; calyx pubescens; petala lanceolata, acuta, reflexa, lineam circiter longa, ciliolata, alba, medio linea citrina percursa; stamen 1, anthera atropurpurea; discus 5-lobus, lævis; drupæ ovi gallinacei magnitudine subreniformi-ovoidæ, læves, obtusæ, aurantiacæ v. luteæ, acido-dulces, subteretes.—*Pegu, Martaban.* M. Indicæ affinis, reticulatione elegantissima statim recognoscenda.

N. B.—*Bouea Brandisiana*, Kurz in Journ. As. Soc. 1871, p. 50, ad *B. Burnanicam*, Griff. in hocce diario, 1854, p. 634, referenda.

*LEGUMINOSÆ.*132. *MILLETTIA MONTICOLA*, nov. sp.

Frutex alte scandens, deciduus, novellis parce ferrugineo-pubescentibus glabrescentibus, ramis verrucosis; folia novella (adulta non visa) imparipinnata; foliola 4-3-juga cum impari, petiolulata, oblonga, breve acuminata, subtus secus nervos adpresse fulvo-pubescentia; flores azurei, parviusculi, pedicello 1-2 lin. longo ferrugineo-tomentoso suffulti, fasciculati, in racemos simplices solitarios ferrugineo-tomentellos 4-7 pollicares supra foliorum delapsorum cicatricibus orientes dispositi; calyx parce ferrugineo-tomentosus, 2-2½ lin. longus, longior quam latus, obsolete et lato-dentatus, denticulo anteriore paullo producto; corolla glabra, vexillo circiter semipollicari; ovarium tenuiter ferrugineo-pubescentis; legumina desunt.—*Martaban. M. pachycarpæ*, Bth., arcte affinis.

133. *MILLETTIA LEOGYNA*, nov. sp.

Frutex deciduus alte scandens novellis ferrugineo-tomentosis; ramis teretibus minute lenticellatis; folia novella (adulta desunt) ferrugineo-tomentosa, imparipinnata; foliola 4-6-juga cum impari; flores majusculi, violacei, vexillo in fundo luteo, pedicellis 2-3 lin. longis nutantibus velutinis suffulti, racemos 4-5 pollicares fulvo-tomentosos e ramulis abbreviatis lateralibus ortos formantes et sæpius in paniculam amplam lateralem collecti; calyx latior quam longus, 2-2½ lin. longus, fulvo-velutinus, obsolete dentatus, dente anteriore paullo producto; corolla glabra, vexillum ½ poll. longum, emarginatum; ovarium læve; legumina juniora linearia, læves, subulato-acuminata.—*Martaban. M. extensæ*, Bth., affinis.

134. *MILLETTIA GLAUDESCENS*, nov. sp.

Arbor magna, decidua, glabra v. sæpius novellis parce pubescentibus; folia imparipinnata, ½-1 ped. longa, glabra, v. rachi et petiolulis parce puberulis; folia elliptica ad obovato-oblonga et oblongo-lanceolata, vulgo 3-4-raro 2-juga cum impari, obtusiuscule et subabrupte acuminata v. apiculata, petiolulis 2-3 lin. longis gracilibus glabrescentibus, integra, 3-4 poll. longa, membranacea, glabra v. subtus secus costam subpubescentia, subtus glaucescentia; flores parviusculi, cyanei, pedicellis capillaribus puberulis v. subglabris 3-4 lin. longis, in racemos graciles glabros v. puberulos solitarios v. secus ramulos novellos aphyllis aggregatos dispositi; calyx latior quam longus, parce pubescens, 1-1½ lin. longus, obsolete lato-dentatus; corolla glabra; vexillum obsolete emarginatum, ½ poll. fere longum; ovarium adpresse sericeum; legumen oblongum, basi attenuatum, lignosum, incurvato-acutum, planum, suturis in alas angustissimas dilatatis undeque quasi subquadrangulato-alatum, glabrum, lenticellis rimosis sparse obtectum, 3-4 poll. longum, 2-3 lin. crassum, 1-3-spermum.—*Pegu, Martaban.*

135. *MILLETTIA PUBINERVIS*, nov. sp.

Arbustula 20-25 pedalis, novellis puberulis; folia impari-pinnata, c.  $\frac{1}{2}$  ped. longa, rachi puberula; foliola elliptico-ad obovato-oblonga, petiolulis gracilibus 1-2 lin. longis puberulis, longiuscule et obtusiuscule acuminata, 2-3 poll. longa, tenuiter chartacea, integra, subtus glauca et secus costam pubescentia; flores parviusculi, luride lutescenti albi, pedicellis capillaribus pubescentibus, solitarii v. fasciculati, racemos solitarios oppositifolios graciles luteolo-pubescentes  $2\frac{1}{2}$ -3 poll. longos formantes; calyx rubicundus, latior quam longus, circ.  $1-1\frac{1}{2}$  lin. longus, parce pubescens, obsolete sinuato-dentatus; corolla glabra; vexillum plus quam  $\frac{1}{2}$  poll. longus; ovarium adpresse pubescens; legumen deest.—*Martaban.*

136. *MILLETTIA LEUCANTHA*, nov. sp.

Arbor mediocris, novellis sericeo-pubescentibus glabrescentibus; folia impari-pinnata,  $\frac{1}{2}$ - $\frac{1}{2}$  ped. longa, juniora subtus sparse pubescentia, mox glabrescentia; stipellæ subulatæ, rigidæ, diutius persistentes; foliola ovata ad elliptica, ut plurimum 3-juga cum impari, longius petiolulato, breve et subabrupte acuminata, petiolulis c. 2 lin. longis puberulis glabrescentibus, 3-4 poll. longa, rigide chartacea, adulta glaberrima, integra, subtus sæpius pallida; flores fasciculati majusculi, candidi, pedicellis 2-3 lin. longis cinereo-velutinis; racemi solitarii, cinerascens pubescentes, erectiusculi, 2-4 poll. longi, in ramulis lateralibus terminales v. laterales; calyx canescenti-velutinus, c.  $2\frac{1}{2}$  lin. longus, dentibus 3 inferioribus distinctis, acutiusculis, 2 superioribus connatis lato-ovatis; corolla glabra; vexillum  $\frac{1}{2}$  poll. fere longum, integrum; ovarium adpresse sericeum; legumen lignosum, oblongum ad obovato-oblongum, acutum, glabrum, lenticillato-scabrum,  $1\frac{1}{2}$ -3 poll. longum, marginibus uti in *Pongamia obtusis*, 1-3 spermum; semina plana, brunnea.—*Prome, Pegu.*

137. *MILLETTIA OVALIFOLIA*, (*Pongamia ovalifolia*, WA. Prod. I. 262; Wight Jc. t. 328.)

Arbor mediocris, glabra; folia impari-pinnata,  $\frac{1}{2}$ - $\frac{1}{2}$  ped. longa, glabra; foliola ovata ad elliptica et elliptico-ovata, petiolulis 1-2 lin. longis gracilibus, 3 (sec. WA. etiam 4-)juga cum impari, breve acuminata, apiculata v. obtusiuscula,  $\frac{1}{2}$ -1 poll. longa, chartacea, integra, subtus subglaucescentia, subtiliter reticulata; flores solitarii v. subfasciculati cyanei, parviusculi, pedicellis capillaribus 2-3 lin. longis; racemi graciles, glabri, 2-3 poll. longi, solitarii v. plures e ramulis novellis orti; calyx glaber, purpurascens, latior quam longus, c. 1 lin. longus, obsolete dentatus v. subtruncatus; corolla glabra, vexillum c.  $\frac{1}{2}$  poll. longum; ovarium parce adpresse pubescens; legumen lineari-oblongum, basin versus attenuatum, incurvato-acutum, planiusculum suturis obtusis, sublignosum, glabrum, pallidum, sparse verrucoso-lenticillatum, 2-3 poll. longum, ad medium 2-3-spermum.—*Prome.*

138. *MILLETTIA BRANDISIANA*, nov. sp.

Arbor mediocris, gemmis cupreo v. fulvo-pubescentibus, cæterum glabra ; folia impari-pinnata,  $\frac{1}{2}$ -1 ped. longa, glabra ; stipellæ subulatæ, diutius persistentes ; foliola 7-10-juga cum impari, oblongo-lanceolata, petiolulis lin. longis puberulis, obtuse acuminata,  $1\frac{1}{2}$ -2 $\frac{1}{2}$  poll. longa, integra, juniora membranacea et subtus parce minuteque puberula, demum rigide sed tenuiter coriacea, glaberrima, subtus glaucescentia ; flores cyanei, majusculi, pedicellis crassiusculis 2-3 lin. longis glabris suffulti, fasciculati, racemos 4-8 poll. longos glabros secus ramulos novos distributos formantes ; calyx purpureus, glaber, c. 2 lin. longus, tomentosus-fimbriatus, dentibus conspicuis, anteriore magis producto, posterioribus brevibus lateque connatis ; corolla sericeo-pubescentis ; vexillum  $\frac{1}{2}$  poll. fere longum ; ovarium adpresse pubescens ; legumen obovato-oblongum ad oblongum et oblongo-lanceolatum, basi plus minusve attenuatum, rigide coriaceum, valde planum, subabrupte incurvato-acuminatum, 2-3 poll. longum, suturis haud incrassatis, brunnescentibus, læve, 1-3-spermum.—*Pegu. M. pulchræ* (= *Mundulea pulchra*, Bth.) affinis.

139. *MILLETTIA TETRAPTERA*, nov. sp.

Arbor mediocris, novellis molliter pubescentibus ; folia impari-pinnata,  $\frac{1}{2}$ - $\frac{3}{4}$  ped. longa, juniora molliter tomentosa ; foliola 3-(raro 2-1) juga cum impari, obovata ad elliptico-obovata, petiolulis crassis 1-2 lin. longis tomentosis, apice rotundata, subemarginata v. rarius apiculata, integra, novella membranacea et utrinque canescenti-tomentosa, demum rigide chartacea et supra glabrescentia ; flores fasciculati parviusculi, pallide lilacini, pedicellis 2-3 lin. longis dense pubescentibus ; racemi 3-4 poll. longi, fulvo-v. gilvescenti-tomentosi secus ramulos foliatis novos siti v. apicibus oppositifolii ; calyx latior quam longus,  $1\frac{1}{2}$  lin. longus, tomentosus, obsolete sinuato-dentatus v. subtruncatus ; corolla glabra ; vexillum c.  $\frac{1}{2}$  poll. longum ; ovarium adpresse pubescens ; legumen subcuneato-oblongum, basi sterili attenuatum, lignosum, incurvato-acutum, 3-4 poll. longum, pallidum, læve, marginibus in alas irregulares lignosas sæpius undulatas angustas dilatatum et quasi tetrapterum, 1-2 spermum.—*Ana, Prome.*

140. *ERYTHRINA HOLOSERICEA*, nov. sp.

Arbor aculeato-armata, novellis furfuraceo-puberulis ; folia iis *E. lithosperma* conformia, 3-foliolata, petiolo 3-4 poll. longo, glabra : foliola plus minusve ovata, petiolulis 2-3 lin. longis, acuminata, 3-5 poll. longa, integra, chartacea v. membranacea, glabra ; flores magni, coccinei ? alis carinaque purpureis, subsessiles, 2-3-ni fasciculati, in racemo fulvo farinaceo-tomentoso collecti ; calyx resupinatus, brevi-spathaceus brunneo-villosus, intus fulvescenti-sericeus ; vexillum  $1\frac{1}{2}$  poll. fere longum, obovato-cuneatum, obtusum, minute-velutinum ; alæ falcato-oblongæ, obtusæ, c.  $\frac{1}{2}$  poll. longæ ; carina

c.  $\frac{1}{2}$  pollicaris, e petalis 2 oblique oblongis acutiusculis breve unguiculatis medio tantum connatis composita; stamina monadelphia; ovarium fulvo-tomentellum; legumen deest.—*Pegu*. Ex affinitate *E. lithospermæ*, Miq., (= *E. Sumatrana*, Miq.) vix Bl. cujus planta e Mauritio in Hort. Bog. allata fuerat. (cf. Bl. Cat. Buitenz.)

141. *DALBERGIA CANA*, Grah. in Wall. Cat. 5859.

Arbor magna, novellis pubescentibus glabrescentibus; folia impari-pinnata; juniora parce pubescentia, mox glabrescentia, 1-2 ped. longa; foliola 7-9-juga, alterna, petiolulis 1-1 $\frac{1}{2}$  lin. longis glabrescentibus, oblonga ad ovato-v. lineari-oblonga, sæpius subinæqualia, breve et subabrupte acuminata, 2-2 $\frac{1}{2}$  poll. longa, integra, chartacea, adulta glabra v. subtus puberula; flores parvi, luride purpurei, pedicellis capillaribus puberulis 1-2 lin. longis suffulti, paniculam laxam puberulam breve pedunculatam axillarem v. sub-lateralem formantes; calyx atropurpureus, glaber v. subglaber, c. 2 lin. longus, dentibus obtusis; corolla glabra, 3 lin. fere longa, petalis longe unguiculatis; stamina 10, diadelphia; ovarium pilosum; legumen lineari-oblongum, planum, 3-1-spermum, obtusum, basi in stipitem brevem constrictum 3-4 poll. longum, fulvo-velutinum, circa semina indistincte venosum.—*Pegu Martaban, Tenasserim.*

142. *DALBERGIA GLOMERIFLORA*, nov. sp.

Arbor mediocris, decidua, novellis fulvescenti-tomentosis; folia juvenilia tomentosa glabrescentia, impari-pinnata; folia 3-4-juga, alterna, ovata ad elliptica et obovata, petiolulis parce pubescentibus 1-2 lin. longis, acuta, 2-2 $\frac{1}{2}$  poll. longa, integra, tenuiter coriacea, supra glabra, subtus parce puberula; flores parvi, albi, pedicellis brevissimis, v. subsessilibus, in paniculas subcapitatas ramulos novos villosos terminantes conglomerati; calyx c. 1 $\frac{1}{2}$  lin. longus, glaber, dentibus obtusis; corolla glabra, calyx paullulo longior, petalis brevissime unguiculatis; stamina 10, diadelphia; ovarium glabrum; legumen desideratur.—*Prome.*

*ABILLARIA*, gen. nov.

Calyx amplus, dentibus 2 superioribus paullo majoribus. Vexillum sub-orbiculare, alæ carinaque subconformes, securiformi-falcatae; petala omnia breve unguiculata et libera. Stamina 10, libera, inæqualia, omnia fertilia; antheræ versatiles. Ovarium brevi et crasse stipitatum, 2-ovulatum; stylus filiformis, revolutus, stigmate laterali. Legumen oblongum, teres, carnosum-coriaceum, utrinque dehiscens. Semina 2 v. abortu ut plurimum solitaria, magna, oblonga, nigra, arillo carnosum miniato complete involutum. Cotyledones crassæ, radícula centrifugalis.—Arbor foliis impari-pinnatis, foliis oppositis stipellatis. Flores majusculi, albi, racemosi, in paniculas terminales collecti. Genus juxta *Ormosiam* ponendum, arillo insigni, unde nomen.



*Chanolobii* species ambæ a cl. Miquelio confectæ ad *Ormosiam coarctatam*, Jack, reducendæ.

143. A. ROBUSTA, (*Sophora robusta*, Roxb., Hort. Beng. 31; Wight Jc. t. 245; *Ormosia floribunda*, Wall. Cat. 5337.)

Arbor mediocris sempervirens, novellis fulvo-velutino-tomentosis; folia impari-pinnata, 1-1½ ped. longa, rachi fulvescenti-pubescente; stipellæ persistentes, c. 2 lin. longæ, lineari-subulatæ, pubescentes; foliola 4-5-juga, oblonga, petiolulis crassis 2 lin. longis pubescentibus, acuta v. apiculata, 3-4 poll. longa, integra, tenuiter coriacea, adulta supra glabra, subtus fulvescenti-puberula; flores majusculi, luride albi, pedicellis brevibus crassis tomentosis suffulti, racemosi, in paniculam terminalem robustam ferrugineo-v. fulvo-tomentosam collecti; bracteæ persistentes, lineares, tomentosæ, 2-3 lin. longæ; calyx amplus, 3 lin. fere longus, dense tomentosus; corolla glabra, c. 3 lin. longa; ovarium villosum; legumen oblongum v. elliptico-oblongum, basi in stipitem brevem pubescentem crassum contractum, acutum, carnosocoriaceum, luteum v. gilvum, parce pubescens v. subglabrum, mono-rarissime 2-spermum; semen magnum, oblongum, aterrimum, lucidum, arillo miniato dein sanguineo carnosio complete involutum.—*Pegu, Tenasserim.*

144. PTEROLOBIUM MACROPTERUM, nov. sp. (*P. lacerans*, Miq. Fl. Ind. Bât. I. 106, non R. Br.)

Frutex magnus scandens, aculeis brevibus armatus, novellis parce pubescentibus; folia ½-1 ped. longa, abrupto bipinnata, pinnis 7-8 v. pluribus rachibus aculeatis puberulis; foliola 7-9 v. pluri-juga, subsessilia, inæquali-oblonga v. elliptico-oblonga, ½-¾ poll. longa, apice rotundata v. retusa, membranacea, glabra, subtus pallida; flores albi, parvi, breviter pedicellati, racemos axillares solitarios (glabros?) efficientes; legumina samaroidea, basi seminifera plus quam ½ poll. longa, elliptico-oblonga, ala sesquipollicari, pollicem fere lata, semi-oblonga, apice rotundata, sutura interiori recta, nec arcuata.—*Pegu, Martaban, Tenasserim.*

Species Indicæ 3 mihi notæ, nempe, *P. microphyllum*, Miq. (Hb. Maingay No. 535) racemis in paniculas terminales amplas dispositis, et *P. lacerans*, R. Br. (Wight Icon. t. 196), cum specie nova supra descripta racemis axillaribus solitariis conjunctum, leguminibus autem valde discrepans.

145. CASSIA BENIGERA, Wall. Cat. 5307; Bth. in Linn. Trans. XXVII. 518.

Arbor mediocris, novellis molliter pubescentibus; folia abrupte pinnata, ½-1 ped. longa, molliter pubescentia; stipulæ magnæ, lunato-reniformes, deciduæ; foliola 8-20-juga, petiolulis brevissimis, v. subsessilia, elliptico-oblonga ad oblonga, obtusa v. retusa cum mucrone minuto, ½-1½ poll. longa,

membranacea, molli-pubescentia; flores speciosi, purpurei, pedicellis 1-1½ pollicaribus pubescentibus, in racemos solitarios v. geminatos supra foliorum delapsorum cicatricibus ortos pubescentes brevissimos dense bracteatos collecti; bracteae cordato-ovatae, longe acuminatae, pubescentes; calyx breve denseque pubescens; petala oblonga, pollicem fere longa, obtusiuscula; ovarium filamentaque glabra; filamenta longiores medio incrassata; legumen cylindricum, 1-2 ped. longum, indehiscens, glabrum.—*Ava, Promé.*

146. *BAUHINIA ROSEA*, nov. sp.

Frutex scandens, novellis fulvo-puberulis; folia cordato-rotundata, usque ad ½ partem biloba, lobis rotundatis cum aristâ brevi in eorum sinu auctis, petiolo 1½-2 pollicari puberulo, 3-5 poll. longa et lata, integra, chartacea, juniora supra fugaci-pubera mox glabra, subtus fulvescenti puberula; flores parviusculi, rosei, pedicellis 1½-2 poll. longis gracilibus adpresse puberulis, racemum terminalem bracteatum corymbiformem fulvo-pubescentem formantes; bracteae lineari-lanceolatae, acuminatae, c. 4 lin. longae; calyx adpresse fulvo-puberulus, tubo brevi, lobis in alabastro tereti-ovoideis, dein liberis et reflexis 4 lin. longis lineari-lanceolatis; petala longe unguiculata, obovato-linearia, undulata, utrinque parce adpresse pubescentia, c. ¾ poll. longa; ovarium cum stylo crasso brevi (ovario breviori) fulvo-villosum; legumen deest.—*Martaban.* (Dr. Brandis.) *A. B. Vahlîi* inter alia differt stylo et floribus minoribus.

147. *BAUHINIA ORNATA*, nov. sp.

Frutex alte scandens cirrhiferus, novellis ferrugineo-pubescentibus; folia cordato-ovata ad cordato-rotundata, petiolo 1½-3 poll. longo in juventute ferrugineo-pubescente suffulta, usque ad ½ v. ¾ partem biloba, lobis obtusiusculis v. obtusiuscule acuminatis et in sinu aristatis, 4-7 poll. longa et lata, integra, chartacea, juniora subtus parce adpresse ferrugineo-pubescentia, mox glabrescentia, palmatim 11-15-nervia; flores parvi, albi, pedicellis gracilibus 1-1½ pollicaribus, ferrugineo-pubescentibus, apice pedunculî longioris v. brevioris glabrescentis in racemum corymbiformem multiflorum bracteatum fulvo-pubescentem lateralem v. terminalem congregati; bracteae lineari-lanceolatae, pubescentes, c. 2 lin. longae; calyx in alabastro pyriformis, adpresse pubescens, lobis ovatis c. 3 lin. longis reflexis; petala obovato-oblonga, extus parce pubescentia, subundulata, c. 4 lin. longa; ovarium fulvo-villosum, stylo longo gracillique glabro; legumen non repertum.—*Pegu.*

148. *BAUHINIA INVOLUCELLATA*, nov. sp.

Frutex scandens, novellis parce puberulis; folia cordato-ovata, petiolo glabro 1½-2 poll. longo, usque ad ½-¾ partem biloba, lobis obtusiuscule acuminatis in sinu aristatis, 3-4 poll. longa, integra, tenuiter chartacea, glabra, palmatim 9-11-nervia; flores majusculi, pallide rosei, pedicellis 2-2½ polli-

caribus puberulis glabrescentibus infra apice bibracteolatis suffulti, racemum longiorem v. breviorum laxum terminalem puberulum glabrescentem formantes; bractee minutae, indistinctae; bracteolae sub calyce elliptico-oblongae, obtusiusculae,  $\frac{1}{2}$  poll. longae, intus velutinae, quasi involucrium bifoliatum formantes; calyx velutinus, tubo sulcato-tubulari, c. 3 lin. longus v. longior, lobis in alabastro oblongo-ovato lanceolatis acuminatis  $\frac{1}{2}$  poll. longis dein liberis et reflexis; petala  $1\frac{1}{2}$  poll. fere longa, lamina ovato-oblonga, obtusa, unguis longitudine; ovarium laeve, stylo longiusculo sed crasso; stamina fertilia 3; legumen desideratur.—*Martaban* (Dr. Brandis).

149. *BAUHINIA MONANDRA*, non. sp.

Frutex? novellis puberulis; folia parva, rotundato-ovalia, basi truncata, petiolo  $\frac{1}{2}$ -1 pollicari brevis pubescente, usque ad  $\frac{1}{2}$  partem biloba, lobis rotundatis in sinu aristatis, 1- $1\frac{1}{2}$  poll. longa, integra, chartacea, supra glabra, subtus praesertim secus nervos brevis pubescentia, palmatim 11-nervia; flores majusculi, albi? petalo inferiore maculato, pedicellis 1- $1\frac{1}{2}$  pollic. longis dense puberulis, racemos breves terminales pubescentes formantes; bractee parvae, subulatae; calyx extus tomentellus, in alabastro fusiformis, spathaceus; petala obovato-cuneata, c.  $1\frac{1}{2}$  poll. longa, glabra, undulata, stamen perfectum unicum tantum, caetera omnia rudimentaria; ovarium stipitatum fulvo-villosum, suturis laevibus, stylo gracili ovarii ipsius duplo longiore terminatum; legumen deest.—*Burma, Martaban?* (Dr. Brandis). Ex affinitate *B. tomentosa*, cum *B. brachycarpa*, Wall., ultro comparanda.

150. *AFZELIA RETUSA*, nov. sp.

Arbuscula glaberrima; folia abrupte pinnata, rachi brevissima glabra; foliola uni- v. bijuga, plus minusve ovalia, sub-obliqua, brevissime petiolulata,  $1\frac{1}{2}$ -2 poll. longa, integra, chartacea, emarginata, glabra; flores parviusculi, albidi pedicellis c. 4 lin. longis glabris, racemos breves simplices glabros in ramulis terminales efficientes; bracteolae sub calyce 2 parvae, concavo-cymbiformes, persistentes; calyx laevis, tubo c. 4-lin. longo, lobis obovato-oblongis aequi-longis; legumen 3-4 poll. longum, 1- $1\frac{1}{2}$  poll. latum tenuiter coriaceum, oblongum, secus margines incrassatos subcurvum, glabrum.—*Andamans.*

151. *PARKIA LEIOPHYLLA*, nov. sp.

Arbor vasta, 80-120 pedalis, novellis pubescentibus; folia abrupte bipinnata, 1-2 pedalia, pinnis c. 20 v. pluribus suboppositis, rachibus brevis pubescentibus; foliola c. 30-40, sessilia, opposita, lineari-oblonga, subfalcata, basi oblique auriculata,  $\frac{1}{2}$  poll. longa, c. 2 lin. lata, oblique acuta, tenuiter coriacea, glaberrima, unicostata cum nervo solitario basilari laterali, penninervia; flores parvi, flavescentes, in receptaculo irregulari-globoso basi

in stipitem pollicem fere longo contracto sessiles et capitulum densiflorum clavatum longe-pedunculatum formantes; pedunculi  $1-1\frac{1}{2}$  pedales, glabri, racemosi, terminales; calyx 4 lin. fere longus, tubo glabro, lobis rotundatis extus dense fulvo-tomentosis; legumen  $1-1\frac{1}{2}$  ped. longum, lineare, in stipitem  $\frac{1}{2}-\frac{2}{3}$  pedalem attenuatum, apice rotundatum, glabrum et subvernicosum, nigrum, inter semina numerosa torosum.—*Pegu.*

152. *PARKIA INSIGNIS*, nov. sp.

Arbor vasta, 80-100-pedalis, novellis fulvo-pubescentibus; folia abrupte bipinnata, 1-2-pedales, pinnis c. 8 suboppositis, rachibus fulvo-v. ferrugineo-tomentosis; foliola 20-25 juga, subopposita, subfalcata, oblonga, cum basi inæquali sub-auriculata sessilia, apice rotundata, 1 poll. longa,  $\frac{1}{2}$  poll. lata, integra, coriacea supra nervis exceptis glabra, subtus pubescentia, penninervia, nervis arcuatim anastomozantibus; flores parvi, lutei in receptaculo clavato-orbiculari basi in stipitem pollicarem attenuato sessiles et capitulum clavato-pyriformem longe pedunculatum efformantes; pedunculi pedales, plures ex apice ramorum orientes; calyx c. 4 lin. longus, tubo glabro v. subglabro, lobis obovato-cuneatis adpresse fulvo-pubescentibus; legumina non vidi.—*Martaban.*

153. *ALBIZZIA (Pithecolobium) GLOMERIFLORA*, nov. sp.

Frutex 2-5-pedalis, novellis puberulis, ramulis subangularibus v. teretibus; folia abrupte bipinnata, pinnis unijugis, petiolus  $1-1\frac{1}{2}$  pollicaris, rachibus vix angularibus præsertim junioribus puberulis; foliola 3-raro 2-juga, petiolis brevissimis puberulis, oblique oblongo-lanceolata ad subrhomboideo-lanceolata breve mucronato-acuminata, 1-2 poll. longa, tenuiter et rigide coriacea, adulta glabra v. subglabra, v. secus costam puberula, subtus glaucescentia et secus nervos pubescentia; flores parvi, virescenti-albi, sessiles, in capitula pisi magnitudinis pedunculis gracillimis  $\frac{1}{2}-1$  pollicaribus puberulis instructa congregati et in racemos graciles puberulos axillares dein sæpius paniculam terminalem foliatam simulantes dispositi; calyx vix  $\frac{1}{2}$  lin. longus, pubescens; corolla usque ad calycis limbum lobata, extus pubescens, c.  $1\frac{1}{2}$  lin. longa; legumina non adsunt.—*Martaban.*

*RUBIACEÆ.*

154. *PAEDERIA CALYCINA*, nov. sp.

Herba volubilis, novellis puberulis; folia cordato-ovata ad cordato-lanceolata, petiolo  $1-1\frac{1}{2}$  pollicari puberulo suffulta, basi sinuato-cordata, acuminata, 2-3 pollicaria, integra, membranacea, utrinque præsertim subtus parce hispidula; flores ... superiores pedicellati, lateralibus sessilibus v. subsessilibus, in cymas dichotomas secundas parvas parce hirsutas digesti, et paniculas thyrsoides brachiatas hirsutulas axillares et terminales efformantes;

calyx indistincte puberulus, tubo c.  $\frac{1}{2}$  lin. longo v. longiore, lobis fere duplo longioribus, lanceolatis, subfoliaceis; corolla ...; capsulæ ovoides, c. 4 lin. longæ, compressæ, brunneæ et lucidæ, calycis limbo conspicuo coronatæ; semina capsulis conformia, alâ nigrescenti c.  $\frac{1}{2}$  lin. latâ circumdata.—*Tenasserim* (Wall. Cat. 6247 E).

Rubiacearum genera 44 in regno Burmanico occurrentia mihi cognita sunt, quorum conspectum hic addo:—

Trib. I. STELLATAE. Calyx ovario omnino adnatus, v. limbo 4-6-fido. Corollæ lobi valvati, ovarium 2-loculare, ovulis in loculis solitariis erectis, adscendentibus v. raro pendulis. Drupa indehiscens, sicca v. succulenta. Semina exalata et libera, v. raro membrana alatum-expansa circumdata.—Stipulæ ut plurimum in folia stipulacea transformata et foliis conformes v. subconformes, lineæ cum foliis verticillata, raro folia normaliter opposita.

§ 1. *Eustellatæ*. Semina magis minusve globosa, libera, erecta v. adscendentia. Stipulæ foliaceæ evolutæ.

1. *Rubia*, L. Flores pentameri. Drupa succulenta. Herbæ annuæ v. perennes, erectæ v. scandentes. •
2. *Galium*, L. Flores 4-meri. Drupa ut plurimum didyma, v. globosa, exsucca. Herbæ perennes v. annuæ, erectæ v. prostratæ.

Trib. II. COFFEACEÆ. Drupa magis minusve carnosa v. succulenta, rarius bacca, 1-pluri-locularis, ovulis 1 v. pluribus in singulo loculo. Semina haud alata v. appendiculata. Stipulæ interpetiolares veræ connatæ v. liberæ.

- Subtrib. 1. *Coffeæ*. Ovarium 2-loculare, ovulis in loculis solitariis erectis v. medio affixis. Bacca e pyrenis 2 v. pluribus (raro abortu solitariis) tenuicrustaceis v. membranaceis monospermis composita.

§ Ovarium 2-loculare.

\* Corolla valvata. Albumen vulgo carnosum (*Psychotriæ*).

3. *Cephaelis* L. (incl. *Geophila*, Don). Corolla infundibuliformis tubo longo. Calyx 4- v. 5-dentatus v. lobatus. Flores capitati v. solitarii, axillares. Suffrutices v. herbæ perennes repentes.
4. *Hydnophytum*, Jack. Calycis limbus integer. Corollæ tubus brevis. Flores glomerati sessiles. Frutices epiphyti truncis tuberosis.
5. *Psychotria*, L. Corollæ tubus brevis, fauce barbata. Pyrenæ facie interna planæ et integræ. Flores cymosi v. cymosopaniculati. Frutices, raro suffrutices, raro scandentes.
6. *Chasalia*, Comm. Corollæ tubus elongatus, fauce nudus. Pyrenæ facie interna secus placentam centralem excavatæ. Frutices v. suffrutices; inflorescentia precedens.

\* \* Corollæ lobi imbricati v. contorti. Albumen vulgo osseum. (*Ixoreæ*.)

7. *Ixora*, *L.* Corolla hypocraterimorpha, limbo 4-5-partito. Ovula medio affixa. Flores corymbosi v. paniculati. Stipulæ connatæ.
8. *Coffea*, *L.* Corolla infundibuliformis, glabra, limbo 4-7-partito. Baccæ 2- raro 1-spermæ, semina pyrenis chartaceis inclusa. Flores terminales et axillares. Stipulæ liberæ. (Hic *Prismatis*, Thw.).
9. *Serissa*, *Comm.* (incl. *Saprosma*, Bl., *Dysodidendron*, Gardn.). Corolla infundibuliformis, velutina, sæpius unacum calyce subobliqua. Ovula erecta, basilaria. Baccæ 1- rarius 2-spermæ. Flores terminales et axillares. Stipulæ liberæ.  
§ Ovarium 4-9-loculare. (*Lasiantheæ*.)
10. *Lasianthus*, *Jack.* Calyx magis minusve dentatus. Styli et ovarii loculi 4-9. Frutices erecti; flores glomerati v. cymosi, axillares.
11. *Gynochthodes*, *Bl.* Calycis limbus truncatus. Stylus 2-fidus. Ovarium 4-loculare. Frutices scandentes; flores glomerati, axillares.

Subtrib. 2. *VANGUETIÆ*. Ovarium 1-  $\infty$ -loculare, loculi 1-v. raro (in *Polyphragmone*)  $\infty$ -ovulati, ovulis lateraliter affixis v. a medio v. ex apice loculorum pendula. Pyrenæ duræ et osseæ, v. in putamen durum connatæ, v. liberæ et laxiuscule compactæ. Albumen vulgo carnosum.

§ 1. *Euvanguetiæ*. Corolla valvata. Ovula lateraliter v. sub apice affixa.

12. *Vangueria*, *Comm.* Stigma discoideum. Ovarium ut plurimum 5-loculare.
13. *Canthium*, *Lamk.* Ovarium 2-loculare. Drupæ didymæ, v. abortu passim sub-1-loculares. (Hic *Polyoxus*, Miq., non Lour.)

§ 2. *Guettardeæ*. Corolla imbricata.

\* Ovarium 2-loculare, ovulis in loculis singulis 2 placenta centrali affixa. Drupæ elongatione placentæ spurie 4-loculares, loculis spuris 1-spermis. Pyrenæ in putamen connatæ.

14. *Scyphiphora*, *Gærtn.* Styli 2. Drupæ angulato-sulcatæ. Ovulum in loculo superiori spurio erectum, alterum in inferiori pendulum.

\* \* Ovarium 4-  $\infty$ -loculare, ovulis in loculis solitariis pendulis. Pyrenæ in putamen  $\infty$ -loculare connatæ, loculis monospermis.

15. *Quettarda*, L. Stigma crassum, simplex. Drupæ globosæ, majusculæ.  
 \* \* \* Ovarium pluri-loculare, ovulis in loculis pluribus v. numerosis, secus placentas centrales superposita. Drupæ baccatæ, 5-10-loculares, loculi pyrenas spurias (seminibus testa crustaceo-indurata ?) plurimas continentes.
16. *Polyphragmon*, Desf. Stigmata tot quot ovarii loculi.

Subtrib. 3. *RANDIÆ*. Ovarium v. 1-loculare placentis parietalibus, v. sæpius 2- $\infty$ -loculare, loculis  $\infty$ -ovulatis. Semina libera, nec pyrenis inclusa.

§ 1. *Gardeniæ*. Ovarium 1-loculare, placentis 4-5 parietalibus. Corolla imbricata.

17. *Gardenia*, L. Flores sæpius conspicui. Stigma integrum, sulcato-tortuosum. Baccæ magnæ,  $\infty$ -sperma, seminibus in pulpa nidulantibus.

§ 2. *Eurandiæ*. Ovarium 2-loculare. Corolla imbricata.  
 \* Placenta simplex.

18. *Randia*, L. Stigma bilobum; stylus fusiformi-incrassatus. Baccæ magnæ; semina in pulpo nidulantia. Arbores v. frutices erecti.
19. *Griffithia*, W.A. Stigma bilobum; stylus æqualis, haud incrassatus. Baccæ parvæ, haud pulposæ. Frutices scandentes sæpius armati.
20. *Webera*, Schreb. Stigma simplex; stylus æqualis, filiformis. Baccæ parvæ, epulposæ. Arbores v. frutices erecti, inermes.
21. *Diplospora*, DC. Stylus 2-fidus. Baccæ majusculæ, epulposæ. Semina in loculis biseriata (an semper?). Arbores v. frutices erecti inermes. (An potius cum sequenti conjungendum?)
22. *Hypobathrum*, Bl. Stylus 2-lobus. Baccæ parvæ, v. pedicellatæ, epulposæ. Semina in loculis uniseriata. Frutices erecti. (Hic *Hyptianthera*, W.A., Petunga, DC. et probabiliter *Seyphostachys*, Thw., et *Pristidia*, Thw.).  
 \* \* Placentæ 2-fidæ. Stigma 2-5-lobum.
23. *Mussænda*, L. Unus alterve calycis lorum florum exteriorum foliaceo-appendiculatus. Antherarum connectivum haud mucronatum.
24. *Acranthera*, Arn. Calycis dentes haud appendiculati, conformes. Antherarum connectivum mucronato-productum.
- § 3. *Urophylleæ*. Ovarium vulgo 5-6- raro 2-3-loculare. Corolla valvata.

25. *Adenosacme*, Wall. Calyx 5-4-fidus. Corollæ faux nuda. Cymæ v. corymbi terminales v. subterminales, raro laterales.

26. *Urophyllum*, Jack. Calyx integer v. minute denticulatus. Corollæ faux barbata. Florum glomeruli v. cymæ axillares.

Trib. III. CINCHONACEÆ. Capsula exsucca, vario modo dehiscentis v. rarisime indehiscens [vel si carnescens uti in *Sarcocephalo*, v. baccata (uti in *Morindeis*) semina semper alata v. appendiculata]. Ovarium 2- $\infty$ -loculare, loculis 1- $\infty$ -ovulatis. Semina alata, appendiculata, v. nuda. Stipulæ interpetiolares veræ.

Subtrib. 1. Ovarii loculi 2-4,  $\infty$ -v. (in *Cephalantho* ? 1-) ovulati. Capsulæ vario modo dehiscentes. Semina plus minusve alata v. appendiculata.

§ 1. *Morindeæ*. Flores dense capitati. Ovarium 2-v.  $\infty$ -loculare, ovula solitaria et erecta v. numerosa et pendula. Baccæ v. drupæ baccatæ ut plurimum in receptaculo incrassato congregatæ et sæpius in syncarpium connatæ.

\* Ovula et semina in loculis numerosa, imbricato-pendula.

27. *Psilobium*, Jack. Baccæ elongatæ, subfolliculares, discretæ. Arbores v. frutices.

\*\* Ovula et semina in loculis solitaria, erecta.

28. *Morinda*, L. Baccæ sæpius in syncarpium connatæ. Arbores v. frutices, nonnunquam scandentes.

§ 2. *Naucleæ*. Flores in receptaculo incrassato capitati. Capsulæ a basi v. alius modi dehiscentes, siccæ, v. raro (in *Cephalantho*) baccatæ.

\* Capsulæ baccatæ, a basi dehiscentes.

29. *Sarcocephalus*, Afz. Capsulæ baccatæ 2-loculares, v. loculis 2' superpositis sterilibus auctæ, in syncarpium connatæ.

\*\* Capsulæ siccæ, loculicide- v. septicide in coccos 2- $\infty$ -v. raro monospermos dehiscentes.

○ Capsulæ in coccos 2- $\infty$ -spermos dehiscentes. Corollæ et calycis lobi dentibus interjectis carentes.

30. *Nauclea*, L. Flores bracteolis carentes. Arbores, raro frutices erecti.

31. *Stephegyne*, Korth. Flores bracteolis angulari-clavatis circumdati. Arbores.

OO. Capsulæ 2-4-loculares, loculis 1-ovulatis. Calycis et corollæ lobi in sinibus denticulati.





41. *Hedyotis*, L. Flores 4-meri; petala integra. Capsulæ loculicide v. septicide dehiscentes, v. in coccos 2 v. 4 pleiospermos separantes.
- Subg. 1. *Oldenlandia*. Capsulæ magis minusve hemisphericæ et obsolete 2-lobæ, loculicide dehiscentes.
- Subg. 2. *Dimetia*. Capsulæ apice rima hiantè brevè septicide dehiscentes, magis minusve truncato-hemisphericæ et obsolete 2-lobæ.
- Subg. 3. *Metabolos*. Capsulæ septicide dehiscentes v. subdehiscentes, hemisphericæ, apice magis minusve truncatæ, sæpius obsolete 2-lobæ.
- Subg. 4. *Scleromitron* (Allæomorphia, Thw.). Capsulæ in coccos 2, v. eorum divisione, 4 indehiscentes pleiospermos separantes, calycis lobis convergentibus coronatæ. Calyx magis minusve ovoideus v. obovatus. An revera genus proprium? Spermacocis characteribus gaudens sed ovulis et seminibus plurimis discrepans et inter Hedyotidem et Spermacocem quasi intermedium.
- § 2. *Euspermacocæ*. Ovula et semina in loculis erecta et solitaria. Capsulæ dehiscentes, v. in coccos separantes, v. raro indehiscentes.
42. *Spermacoce*, L. (incl. *Hydrophylax*, L. f.?) Ovula medio s. sub medio loculorum affixa. Capsulæ ab apice septicide dehiscentes. Herbæ annuæ v. perennes.
43. *Knoxia*, L. Ovula apice v. sub apice loculorum affixa. Capsulæ a basi in coccos 2 caducos separantes, axim persistentem setaceum relinquentes. Herbæ annuæ v. perennes.
- § 3. *Pædericæ*. Ovula et semina compressa in loculis pendula et solitaria. Capsulæ drupiformes, crustacæ, v. pergamacæ, vix dehiscentes, coccos 2 tenui-membranaceos alatum expansos includentes. An potius inter Coffeaceas recipiendæ?
44. *Pæderia*, L. Corolla valvata. Folia opposita v. 3-4-na verticillata. Volubiles.

### COMBRETACEÆ.

155. *TERMINALIA TOMENTELLA*, nov. sp.

Arbor magna, novellis adpresse cupreo-pubescentibus; folia 5-8 poll. longa, petiolo 8-12 lin. longo apice biglandulose suffulta, basi inæquali decurrentia, ovata ad ovato-oblonga, acuta v. subacuta, coriacea, integra, junio-

ra subtus dense, adulta parce cupreo-pubescentia v. omnino glabrescentia; flores parvi, sessiles, spicati, paniculam parvam ferrugineo- v. fulvo-tomentellam componentes; bracteolæ subulatæ, floribus longiores, deciduæ; calycis lobi triangulares, acuti, extus glabri, intus unacum glandulis hypogynis albo-lanuginosi; tubus ovatus, teres, glaberrimus; drupæ poll.  $\frac{1}{2}$  longæ, ovatæ, obsolete 5-gonæ v. teretes, lutescentes, læves.—*Pegu, Martaban, Tenasserim. T. Chebulæ*, Retz., quam maxime affinis, calycis tubo lævissimo, indumento copiosiore et fructibus minoribus distat.

### BEGONIACEÆ.

#### 156. BEGONIA NIVEA, Parish MS.

Herbula succulenta radice tuberosa?, subglabra; folia radicalia 1 v. 2, obovato-oblonga, apice irregulariter truncato-angulata, basi in petiolum brevissimum crassum glabrum constricta, dentata et parce setuloso-ciliata, palmatim 5-nervia, 2-3 poll. longa, membranacea, supra setulis brevibus adspersa, subtus glabra; scapus radicalis, glaberrimus, folio duplo longior, apice bibracteato, flores 2 v. 3 majusculos candidos gerens; bractæ 2 ovales v. ovali-oblongæ, acutæ, foliaceæ, c. 2-3 lin. longæ; flores fuminei pedicellis brevioribus, masculi longioribus 1-1½ poll. longis glabris, instructi; sepala et petala obovato-oblonga ad lato-ovalia, c. 5 lin. longa, in femineis aliquanto breviora; stamina monadelphæ; antheræ obovato-oblongæ, obtusæ; styli 2, basi v. ad medium fere connati, uno 3- altero 2-bifido et glandulis stigmaticis stipitatis dense obducti; capsulæ immaturæ glabræ, oblongo-ovatæ, inæquali-3-alatæ, alis triangularibus et acute productis, medio majore.—*Tenasserim* (Revd. Parish).

#### 157. BEGONIA SUBPERFOLIATA, Parish MS.

Herbula erecta, succulenta, radice tuberosa? scapigera; folia radicalia solitaria, petiolo 1½ usque ad 3½ poll. longo subvelutino suffulta, ovata ad ovato-oblonga, vix inæqualia, basi rotundata leviter peltata, obtusiuscule acuminata, grosse crenato-dentata, 2-3 poll. longa, membranacea, utrinque pulcherrime concavo-punctata (in vivo probabiliter papilloso-holosericæ), subtus ut plurimum subpurpurascentia; scapus radicalis v. subradicalis, glaber, folio brevior, dichotomo-cymosus, pauciflorus; bractæ virides, elliptico-lanceolatæ, acutæ, c. lin. longæ, papillose; flores parvi, rosei, pedicellis capillaribus glabris; sepala ovalia, obtusa, 2-3 lin. longa, extus conspicue venosa; stamina monadelphæ; antheræ breves, obovatæ; styli 3, alte connati, 2-fidi; capsulæ c. 3 lin. longæ, obovatæ, glabræ, 3-loculares, 3-alatæ, alis capsulâ ipsâ latioribus semi-obcordatis; placentæ 2-fidæ.—*Tenasserim* (Revd. Parish).

#### \*158. BEGONIA VELUTINA, Parish MS.

Herbula simplex, scapifera, unifoliata, radice parva tuberosa; folium petiolo 1-3 poll. longo nonnunquam parce pubescente suffultum, cordato-ova-

tum ad cordato-rotundatum, palmatim 7-nerve, obtusum, v. breve et obtusiuscule acuminatum, irregulariter et breve lobatum, dentatum et ciliatum, c. 1-2 poll. longum et latum, membranaceum, supra papillosum et pilis minutis brevibus adpersum, subtus secus nervos adpresse pubescens; scapi radicales, folio vulgo sublongiores, glabri, pauciflori; bracteae minutae, lineares; flores majusculi, rosei? sepala 4 lin. fere longa, lato-ovalia, obtusa; petala minuta, lineari-lanceolata, acuminata; perianthii feminei lobi dimidio breviores; stamina numerosa, libera; antherae obovatae, breves, truncatae; stigmata 3, libera, apice dilatato in lobos stigmatiferos 2 tortuosos divergentia; capsulae immaturae obovatae, glabrae, 3-loculares, anguste 3-alatae alis apice truncatis; placentae bifidae.—*Tenasserim* (Revd. Parish, Dr. Stoliczka).

*Begonia* species Burmanicae sequenti modo distingui possunt:—

Subg. I. *CASPAREA*. DC. Capsulae carnosae et bacciformes, secus angulos v. alas crassas latas dehiscentes.

Herba robusta glabriuscula ramosa; styli 4; capsulae 4-loculares et 4-angulares, angulis in appendices cornutos productis, ..... *B. Roxburghii*.

Subg. II. *Begonia*, DC. Capsulae siccae, lineae semicirculari secus lateres alarum v. angulorum dehiscentes.

\* Styli 2, bifidi v. vario modo dilatati v. ramosi; capsulae 2-loculares; placentae bifidae.

† Stamina libera. Capsulae inaequali-3-alatae, alis 2 anterioribus saepius ad costam membranaceam reductis.

Herba robusta, ramosa, molliter paleaceo-pilosa; folia longipetiolata, lobata, ..... *B. laciniata*.

Uti prior, sed gracilior et glaberrima; capsula glabra, ... *B. megaptera*,

Herba robusta subsimplex, molliter paleaceo-pilosa; folia longipetiolata, non lobata; capsula paleaceo-pilosa, ..... *B. barbata*.\*

†† Stamina monadelphica. Maris perianthium 5-lobatum, femineum 5-6-lobatum; capsulae inaequali-3-alatae.

|| Folia et inflorescentia radicalis, illa in petiolum 2-3 lin. longum contracta, ciliata, supra hispida; flores poll. fere in diametro, candidi, ... *B. nivea*.

||| Inflorescentia axillaris v. o basi folii orta, v. prolifica e gemma axillari.

O Non prolifica. Folia alterna v. verticillata, raro numero ad solitarium reducta. Flores parvi, albi.

Glabra; folia alterna, petioli 1-2 lin. longi, ..... *B. procridisfolia*.

Glabra; folia verticillata, longius petiolata, ..... *B. verticillata*.

Caules petiolique pubescentes; inflorescentia glabra; folia alterna, longepetiolata, supra sparse hirtula, ..... *B. Martabanica*.

\* Planta Burmanica, floribus roseis gaudens, ab Assamica paullo differt capsulis majoribus crassioribus magis pilosis.

OO. Prolifica, folio solitario radicali v. foliis paucis alternatis. Flores parvi, albi.

Magis minusve stellato-velutina; inflorescentia glabra; folia alterna v. raro solitaria, ..... *B. sinuata*.

Glabra; folium solitarium, pedunculis 2 v. pluribus ex ipsius basi ortis, ..... *B. prolifera*.

Caulis &c., et inflorescentia conspicue bracteata, paleaceo-pilosa, sæpius pilis glandulosis intermixtis, ..... *B. paleacea*.

† † † Stamina monadelphica; perianthium utriusque sexus 2-sepalum, apetalum.

Herba tenerrima; folia alterna, supra minute et sparse pilosa; flores parvi, ..... *B. flaccidissima*.

\* \* Styli 3, liberi v. connati; capsulae 3-loculares et 3-alatae.

† Placentae integrae.

Glabra; inflorescentia radicalis v. subradicalis; folia radicalia profunde lobata; perianthium 2-sepalum, apetalum, ..... *B. Brandisiana*.

† † Placentae bifidae.

O Herbæ caulescentes foliis caulinis alternatis.

Partes omnes et inflorescentia glabra; capsulae 3 lin. longæ, alis apice truncatis; stamina monadelphica, ..... *B. parvuliflora*.

Folia supra sparse setulosa et nitida, cæteris præcedenti assimilis, at capsulae  $\frac{1}{2}$  poll. longæ; stamina libera, antheræ mucronulatae; styli liberi, ..... *B. modestiflora*.

Uti præcedens, sed folia opaca et pilosiora; stamina monadelphica, antheræ connectivo truncato lato terminatae; styli ad medium connati, *B. scutata*.

Folia minute et sparse pilosula; inflorescentia glanduloso-puberula; stamina monadelphica, capsulae alae semisagittatae basi in lobos obtusos productæ, ..... *B. surculigera*.

OO. Herbæ scapigeræ, foliis et inflorescentiis radicalibus et vulgo solitariis.

Folia longissime petiolata, basi peltata, papilloso-punctata et glabra, ..... *B. subperfoliata*.

Folia longissime petiolata, cordata, nec peltata, supra papillosa et minute pilosula; stamina libera, ..... *B. velutina*.

#### ERICACEÆ.

159. VACCINIUM VERTICILLATUM, Kurz, non Wight. (*Agapetes verticillata*, D. Don, Gen. Syst. III. 862.; DC. Prod. VII. 554).

Frutex epiphyticus, 2-3 pedalis, glaber; folia obovato-lanceolata ad subcuneato-lanceolata, petiolo brevissimo crassissimo, v. subsessilia, basi attenuata rotundata v. obtusa,  $2\frac{1}{2}$ - $3\frac{1}{2}$  poll. longa, obtusiuscula v. breviter acuminata, coriacea, integra v. apicem versus obsolete et remote serrata, glabra, nervis

secus marginem anastomozantibus; flores speciosi, coccinei v. miniati, tubulosi,  $\frac{3}{4}$  ad  $1\frac{1}{2}$  poll. longi, pedicellis subpollicaribus, glanduloso-hirsutis suffulti, umbellam v. potius racemum abbreviatum pauciflorum axillarem formantes v. solitarii v. fasciculati; calyx 5-dentatus, glanduloso-hirsutus, dentibus lanceolatis acutis lin. circiter longis; corolla glabra, 5-gona, lobis neari-lanceolatis obtusis; filamenta 2 lin. fere longa; antheræ c. 3 lin. longæ, granulato-tuberculatæ, in tubos rigidos plus quam poll. longos productæ; stigma parvum, truncatum v. sub-5-lobo-peltatum; baccæ glanduloso-hirsutæ, pedunculi apice subcyathiformi-incrassato insidentes, calycis limbo coronatæ.

Var. *a. genuinum*, corolla  $\frac{3}{4}$  poll. tantum longa; flores in racemos umbelliformes brevipedunculatos dispositi. (*Thibaudia obliqua*, Griff., Icon. Dicot. t. 515).

Var. *β. elegans*, corolla præcedentis sed flores solitarii v. 2-3-ni fasciculati axillares; folia vulgo latiora.—*Pegu*.

? Var. *γ. grandiflorum*, corolla duplo longior, flores in racemos umbelliformes breve pedunculatos v. sessiles collecti, rarius solitarii.—*Martaban*, *Tenasserim*.

N. B.—*V. verticillatum*, Wight, Ic. t. 1181. ad *V. setigerum* (*Agapetes setigera*, Don) pertinet.

160. *VACCINIUM VARIEGATUM* (*Agapetes variegata*, Don, Gen. Syst. III. 862; *Ceratostemma variegatum*, Roxb. Fl. Ind. II. 413; Griff. Icon. Dicot. t. 502; *Thibaudia variegata*, Royle, Ill. Him. Pl. t. 79, f. 1.).

Frutex epiphyticus, 2-3 pedalis, glaber; folia lanceolata ad obovato-lanceolata, acuta v. breviter acuminata, petiolis brevissimis crassis, v. sessilia, basi acuta v. obtusa, 2-3 poll. longa, coriacea, apicem versus obsolete repando-serrata, glabra, nervis secus marginem anastomozantibus; flores coccinei, pedicellis gracilibus glabris sursum cyathiformi-incrassatis suffulti, in racemos umbelliformes axillares v. supra foliorum delapsorum cicatricibus ortos pedunculatos glabros dispositi, v. rarius fasciculati v. solitarii; corolla glabra, poll. fere longa, tubulosa, lobis obtusiusculis; calyx glaber, 5-fidus, lobis oblongis lanceolatis c. 2 lin. longis acutis sæpius obsolete costatis et penninerviis; antheræ granulato-tuberculatæ, filamentis brevissimis suffultæ, in tubos  $\frac{1}{2}$ - $\frac{1}{2}$  poll. longos productæ; stigma truncatum; baccæ glabræ, rubræ, calycis limbo coronatæ.

Variat: *a. macranthum* (*Ceratostemma variegatum*, Roxb. et Wight; *Thibaudia macrantha*, Hook., Bot. Mag. t. 4566.) flores c. 2 poll. longi v. longiores, variegati.—*Tenasserim*.

Var. *β. parviflora* (*Thibaudia variegata*, Royle) flores dimidio minores, miniati v. coccinei.—*Martaban*.

161. *VACCINIUM MINIATUM* (*Ceratostema miniatum*, Griff. Icon. Dicot. t. 504.)

Frutex epiphyticus glaber; folia oblongo-lanceolata ad oblonga, acuta v. acuminata, petiolis brevissimis crassis, v. subsessilia, basi subinaequali rotundata, 4-5 poll. longa, acuta v. acuminata, repando-serrulata, coriacea, glabra, subtus nervis numerosis et prominentibus, secus margines evanescentibus, laxè et prominenter reticulata; flores coccinei, racemos breves umbelliformes glabros axillares v. laterales efficientes, raro pauci et fasciculati; calyx glaber; corolla glabra, 5-gona, c.  $\frac{3}{4}$  poll. longa, lobis brevibus linearibus acutis; filamenta brevissima, antheræ tubo inclusæ, granulato-tuberculatæ, tubis strictis nudis paulullo breviores; baccæ desunt.—*Ava?* (Griff.)

162. *VACCINIUM CAMPANULATUM*, nov. sp.

Frutex epiphyticus, glaber, ramulis subangulatis; folia obovato-oblonga ad lanceolata, obtusa v. obtusiuscule acuminata cum mucrone, petiolis brevissimis et crassis v. subsessilia, 2-3 poll. longa, basi acuta v. obtusa, integra v. subintegra, marginibus recurvis, coriacea, glabra, nervis tenuibus secus marginem liberis, laxè reticulata; flores coccinei, sæpius variegati, pedicellis gracilibus glabris suffulti, in racemum gracilem sed brevem glabrum sæpius e ramis ortum dispositi; calyx glaber, limbo cyathiformi argute sinuato-5-dentato; corolla glabra, c.  $\frac{1}{2}$  poll. longa, v. paullo longior, 5-angularis, campanulata, lobis longis lanceolatis acuminatis reflexis; filamenta brevissima; antheræ granulato-tuberculatæ, loculis in tubos strictos anthera ipsa sublongiores dorso basi refracto-setosos terminatis.—*Martaban.*

163. *VACCINIUM MACROSTEMON*, nov. sp.

Frutex epiphyticus, 2-4 pedalis, glaber; folia cum basi crassa rotundata v. obtusa subsessilia, obovato-lanceolata ad lanceolata, acuminata, 3-5 poll. longa, marginibus integris recurva, coriacea, glabra, nervis tenuibus marginem versus liberis, tenuiter et laxè reticulata; flores coccinei, pedicellis gracilibus glabris in racemos magis minusve elongatos glabros subulato-bracteatos solitarie v. geminati supra foliorum delapsorum axillis ortos dispositi; calyx glaber, limbo cyathiformi, lobis longe subulatis; corolla c.  $1\frac{1}{4}$  poll. longa, glabra, subcurvo-tubulosa, lobis linearilanceolatis reflexis; filamenta glabra, gracilia, c.  $\frac{1}{2}$  poll. longa v. longiora; antheræ breviusculæ, connatæ, læves, loculis in tubos strictos anthera longiores productis; baccæ fusiformi-ovoides, apice angustatæ et calycis limbo cyathiformi coronatæ.—*Martaban.*

164. *VACCINIUM PUMILUM*, nov. sp.

Frutex ramosissimus, parvus, epiphyticus, novellis pubescentibus; folia oblonga ad lanceolato-oblonga, petiolo brevissimo puberulo, basi acuta, obtusiuscula, crenulata, crasse coriacea, c. poll. longa v. breviora, subtus (in vivo albid) pallida, nervis obsoletis; flores parvi, pedicellis brevissimis pube-

ruleis, in racemos (2 v. 1) terminales pubescentes bracteatos disgesti; bracteæ deciduæ, albæ, membranaceæ, foliaceæ, ovatæ, puberulæ et ciliatæ; calyx pubescens, dentibus oblongo-lanceolatis, acutis, ciliatis; corolla c. 2 lin. longa, oblongo-urceolata, lobis brevissimis reflexis, 5-gona, extus glabra, intus in primis ad faucem dense villosa, rosea; filamenta brevia, filiformia, apice pilosa et barbata; antheræ glabræ, loculis in tubum brevem lanceolato-subulatum basi bisetosum desinentibus; baccæ parvæ, purpureæ, glabræ, calycis limbo coronatæ.—*Martaban.*

165 *VACCINIUM EXARISTATUM*, nov. sp.

Frutex magnus, sæpius in arbusculam excrescens, novellis pubescentibus; folia oblongo-lanceolata ad oblongo-ovata, petiolis puberulis brevibus suffulta, basi acuta v. obtusiuscula,  $1\frac{1}{2}$ - $2\frac{1}{2}$  poll. longa, acuta v. breve acuminata, subtus dum juvenilia parce pubescentia, glabrescentia, chartacea, serrulata, penninervia et inconspicue reticulata; flores albi, pedicellis 1- $1\frac{1}{2}$  lin. longis puberulis, racemum secundum gracilem puberulum axillarem formantes; bracteæ coccineæ, deciduæ; calyx puberulus v. subglaber, lobis triangulari-acutis, corolla 2- $2\frac{1}{2}$  lin. longa, glabra, urceolata, lobis reflexis brevibus; filamenta pilosa, basi dilatata; antheræ tubis brevibus et setis destitutis terminatæ; baccæ globosæ, glabræ, rubræ, calycis limbo coronatæ.—*Martaban.*

*Var. a. semipubescens*, calyx glaber v. subglaber.

*Var. b. pubescens*, calyx pubescens.

*PRIMULACEÆ.*

166. *LYSIMACHIA LINEARIFOLIA*, Griff., MS. in Hb. Griff. 3532.

Herba annua, erecta, stricta, glabra, caulibus teretibus v. subteretibus simplicibus ped. circiter altis; folia alterna, linearia ad lineari-lanceolata, utrinque acuminata, 1- $1\frac{1}{2}$  poll. longa, petiolo gracillimo sed brevi suffulta, integra, membranacea, glabra; flores parvi, solitarii v. geminati, axillares, longe pedunculati; calycis segmenta lineari-subulata, plus quam lineam longa; pedunculi fructigeri graciles, c.  $1\frac{1}{2}$  poll. longi.—*Ava?* (Griff.). *L. pedunculari*, Wall., affinis. *Lysimachiae* sp. Griff. Not. Dicot. 299. t. 484, speciem mihi distinctam *L. Lobelioidi* affinem nomine *L. Griffithianæ* saluto.

*MYRSINEACEÆ.*

167. *ARDISIA HELFERIANA*, nov. sp.

Frutex? ferrugineo-tomentosus; folia obovato-oblonga ad oblonga, petiolis 3-4 lin. longis crassis dense ferrugineo-pubescentibus, breve acuminata, integra v. obsolete repando-dentata, 3-5 poll. longa, membranacea, utrinque ferrugineo-pubescentia, nervis lateralibus tenuibus et curvis; flores parviusculi, pedicellis  $\frac{1}{2}$ -1 poll. fere longis ferrugineo-pilosis sustenti, racemum subumbelliformem ferrugineo-pubescentem pedunculo nudo 3-4 pollicari gracili



axillari suffulto formantes ; calyx ferrugineo-pilosus, lobis oblongo-lanceolatis, acutis, lineam circiter longis ; corolla glabra, lobis c.  $2\frac{1}{2}$  lin. longis, oblongis, acutis ; drupæ desunt.—*Tenasserim* (Helf. 3589).

168. *ARDISIA SERRULATA*, nov. sp.

Frutex ? novellis tomento minuto ferrugineo obtectis ; folia lanceolata v. elliptico-lanceolata, basi in petiolum 5-8 lin. longum attenuata, breve acuminata v. acuta, repando-serrulata, basin versus integra, 4-6 poll. longa, tenuia et membranacea, glabra, parce punctata, nervis crebris approximatis, subparallelo-divergentibus et inconspicuis ; flores parvi, pedicellis gracilibus inæquali-longis ferrugineo-puberulis suffulti, densiuscule thyrsoidæ racemosi et paniculam terminalem v. ex axillis foliorum superiorum ortam amplam ferrugineo-puberulam bracteata formantes ; bracteæ foliaceæ, lineari-lanceolatæ, 3-6 lin. longæ, subtus ferrugineo-lepidosæ ; bracteolæ minores, lineares ; calyx ferrugineo-puberulus, lobis linearibus acutis c. 1 lin. longis ; corolla subrotata, lobis ovatis acutis c. 2 lin. longis ; drupæ desunt.—*Ava* ? (Griff. 3562). Inter *A. nerifoliam* et *A. floribundam*, Wall., intermedia.

169. *ARDISIA RIGIDA*, nov. sp.

Frutex ? novellis probabiliter indistincte ferrugineo-lepidotis ; folia oblongo-lanceolata, in petiolum 4-6 lin. longum crassum attenuata, breve et obtusiuscule acuminata, pergamacea, integra, 6-9 poll. longa, glabra, punctata, nervis subtus prominentibus et subparallelis ; flores...parvi, pedicellis  $\frac{1}{2}$ - $\frac{3}{4}$  lin. longis crassis minute ferrugineo-puberulis nutantibus suffulti, paniculam terminalem compositam rigidam robustam ferrugineo-puberulam efficientes ; calyx minute et indistincte puberulus, lobis ovatis acutiusculis, vix  $\frac{1}{2}$  lin. longis, ciliolatis ; corolla... ; drupæ immaturæ globosæ, glabræ.—*Tenasserim* or *Andamans*. (Helf. 3563).

170. *MÆSA MUSCOSA*, nov. sp.

Frutex ramis teretibus lævibus nitidisque, ramulis.. ; folia oblonga ad obovato-oblonga, basi acuta v. acuminata, petiolis  $\frac{1}{2}$ -1 poll. longis validis parce puberulis, breve acuminata, grosse sinuato-dentata, pergamacea, 5-7 poll. longa, glabra, costa subtus parce puberula, nervis secus margines in denticula callosa obtusa excurrentibus ; flores minuti, 5-meri, pedicellis brevissimis pubescentibus suffulti, breve racemosi, in paniculam axillarem quasi muscosam petiolis 2-3-pl. longiorem ferrugineo-pubescentem digesti ; bracteæ lin. circiter longæ, pedicellis longiores, ferrugineo-hirsutulæ, lineari-acuminatæ ; bracteolæ ? ; calyx ferrugineo-hirsutus, lin. fere longus, lobis ovato-lanceolatis acutis ; corolla tubuloso-campanulata, glabra, calyce duplo longior, lobis brevibus rotundatis ; ovarium sub-inferior ; stylus calycis lobos longitudine haud attingens.—*Burma* (Griff. 3556). Ex affinitate *M. mollissi*.

*mæ.* *M. permollis*, species olim a me in hocce diario descripta (cf. 1871, p. 66) nunc formam extremam latifoliam *M. mollissimæ*, Wall., habeo. Formas intermedias inter ambas species nuper in Burmania haud raro observavi.

### SAPOTACEÆ.

171. *ISONANDRA CALOPHYLLA*, Kurz, in Journ. As. Soc. Beng. 1871, 9.

Arbor mediocris, novellis dense adpresse ferrugineo-pubescentibus; folia elliptica v. elliptico-oblonga, petiolis 4-5 lin. longis cupreo-puberulis glabrescentibus, breve acuminata, integra, marginibus recurvulis, 4-7 poll. longa, chartacea, minute ferrugineo- v. cupreo-sericea glabrescentia, supra nitida, nervis lateralibus prominentibus validis, transverse tenui-venosa; flores nondum reperti; fructus pruni magnitudinis, pedunculo nutante, 1-1½ pollicari subglabro axillari sustenti, elliptico-ovati, apiculati, dense ferrugineo-puberuli, 1-2-spermi, basi calyce persistente 6-partito lobis ovatis supportati; semina semi-oblonga, 1½ poll. fere longa, lucida, brunnea.—*Andamans.*

### EBENACEÆ.

172. *GUNISANTHUS MOLLIS*, nov. sp.

Arbuscula ramis novellisque brunneo-pubescentibus; folia petiolo brevissimo (c. 1 lin.) suffulta, anguste oblonga v. oblongo-lanceolata et saepius basin obtusam versus subangustata, obtusiuscule acuminata, 3-4 poll. longa, chartacea, supra secus costam et subtus omnino mollior pubescentia; flores ochracei, extus dense pubescentes, pedicellis 4-6 lin. longis pilosis suffulti, racemos breviusculos pilosos efficientes; calycis lobi lineari-lanceolati, c. 3 lin. longi, tubo multo breviores; corollæ lobi tubo calyceino paululo longiores, feminei fructusque adhuc ignoti. *Diospyros mollis*, Kurz MS. olim.—*Martaban.*

173. *DIOSPYROS SAPOTOIDES*, nov. sp.

Arbor mediocris, novellis parce ferrugineo-pubescentibus mox glabrescentibus; folia elliptico-oblonga ad elliptica, basi obtusa, petiolo vix semipollicari glabrescente crasso suffulta, 6-8 poll. longa, breve et obtusiuscule acuminata, integra, coriacea, reticulatione laxissima subtili et immersa percursa; flores hermaphrodito-feminei 4-meri, flavescenti albi, iis *D. sapotæ* assimilés, subsessiles, glomerati, pedunculo crassissimo axillari brevissimo; calyx extus ferrugineo-pubescentis, lobi ovato-lanceolati marginibus reflexi et basi auriculato-complicati, 3 lin. fere longi, acuminati; corollæ tubus urceolatus, calyce sub-duplo longior, extus ferrugineo-pubescentis, lobis obovatis tubi fere longitudinis; stamina c. 12, tubo basi inserta, glabra, inæqualia; antheræ ovato-lanceolatæ, acuminatæ; filamenta filiformia, glabra; ovarium ovatum, glaberrimum, stylo moderate longo 4-fido; flores masculi fructusque desunt.—*Pegu.*—*D. undulatæ* arcte affinis, sed ovario glaberrimo discrepat.

abdominal segments, and on the lower side the first segment is centrally grooved; neither of these characters are mentioned by Lucas, though when describing the respective parts he could hardly have overlooked these prominent characters. I consider Koch's *rufipes* as the same which he describes under the name of *proscorpio*; for the differences which he notices as distinguishing the two are decidedly of no specific value.

In the second group with two denticles on the second joint of the cheliceres, Butler describes *T. formosus*. My specimen of evidently the same species has six denticles of which, however, only two are well marked.

In the third division, including species with six well developed denticles, one is referred to under the old name of *T. caudatus*. I shall attempt to trace the history of this name when speaking of *T. indicus*, (n. sp.), which is possibly the same species as the one referred to by Butler from Madras and Bengal under the name of *T. caudatus*.

In addition to the three sections, I have one species, *T. Beddomei*, from the Anamallies, with seven denticles on the upper edge of the second joint. Among the very large number of specimens of *T. scabrinus*, (n. sp.), I found instances in which the second left joint has occasionally six denticles, while the right one had constantly only five. This clearly shews that the sections solely based upon the character, selected by Mr. Butler, can have only a very limited use.

Thus far I have commented upon Mr. Butler's determinations, but it must be understood that in the above instances my observations are mainly based upon descriptions and figures; for I have no other but Indian specimens for comparison. If those descriptions and figures were found to be incorrect, or not reliable, the mistakes had first to be pointed out and corrected, before a determination, based upon them, was admitted or rejected.

Finally, before entering upon the specific details, I must briefly allude to the geographical distribution of the genus. This distribution extends from South America and the West Indies northwards to Mexico, in a westerly direction through the ocean of little islands to the Philippines, touching North Australia, and stretching North as far as Corea, China and through the Malay Peninsula to Burma and India, where we meet with most of the species in the provinces of Assam and Sikkim, more rarely in Bengal and in South India, including Ceylon, all countries which have a marked admixture of Malayan types. No species is known to occur westward of the country alluded to, not even in Eastern Africa, as far as we know at present. This distribution resembles in so many respects that of the *PASSALIDÆ*, that I shall again return to its discussion at an early opportunity.

lia, breve acuminata, 3-5-poll. longa, integra, membranacea, glabra, subtus pallida; flores pedicellis 1-1½ lin. longis suffulti, cymas 3, v. raro 2, v. plures breve pedunculatas, v. nonnunquam subsessiles, glabras paucifloras in ramulorum superiorum furcationibus sitas efformantes; calyx glaber, brevissimus, 5-fidus, segmentis lineam vix longis, lanceolatis, acutis; corollæ tubus subcrassus, c. 4 lin. longus, apice inflatus, lobis tubo vix dimidio brevioribus; folliculi... —*Martaban.* *T. rostratæ*, Wall., affinis videtur, a qua inter alia corolla duplo brevior differt.

178. *TABERNÆMONTANA MEMBRANIFOLIA*, nov. sp.

Frutex 3-4 pedalis, glaber; folia lanceolata ad lato-lanceolata, in petiolum 3-5 lin. longum attenuata, 3-5 poll. longa, longe et graciliter acuminata, integra, membranacea, glabra, subconcolora; flores albi, pedicellis gracilibus 4-6 lin. longis glabris inserti; cymæ vulgo binæ, breve pedunculatæ, dichotomo-ramosæ, glabræ, laxæ, corymbiformes in ramulorum superiorum furcationibus sitæ; bracteæ nullæ v. minutæ et deciduæ; calyx minutus, lobis lineari-subulatis, lineam vix longus; corollæ tubus gracilis 1 poll. longus, infra medio circa antheras leviter inflatus, lobi lineari-lanceolati, acuminati, tubo dimidio circiter breviores; folliculi desunt.—*Martaban.* *T. subcapitatæ*, Wall., affinis, sed calyce jam distincta.

*BIGNONIACEÆ.*

179. *SPATHODEA VELUTINA*, nov. sp.

Arbor, novellis fulvo-puberulis; folia impari-pinnata, 1-1½ ped. longa, petiolo glabro striato basin versus 1-2 foliolis diminutis stipuliformibus munita; foliola 4-juga cum impari longe petiolato, basi inæqualia, sessilia v. subsessilia, oblongo-lanceolata, acuminata, 4-6 poll. longa, serrulata, membranacea, glaberrima; inflorescentia deest; calyx spathaceus, recurvato-acuminatus, extus fulvescenti-velutinus, c. 1½ poll. longus; corolla c. 3 pollicaris, campanulato-infundibuliformis, glabra, tubo pollicari constricto, filamenta glabra, tubo supra constrictione inserta; capsula deest.—*Ava, Pegu* (Dr. Brandis).

180. *HETEROPHRAGMA SULFUREA*, nov. sp.

Arbor mediocris decidua, novellis tomento fugaceo canescenti-villoso obductis; folia impari-pinnata, 2-3 ped. longa, rachi petioloque fugaciter floccoso-tomentoso; foliola 4-5-juga cum impari longe petiolato, elliptica et ovato-elliptica ad ovalia, juniora obtusiuscule apiculata v. obtusiuscula et obsolete serrata, basi rotundata v. obtusa, sessilia v. brevissime petiolulata, 4-6 poll. longa v. longiora, chartacea, parce puberula, supra mox glabrescentia; flores sulfurei, conspicui, pedicellis cinerascenti v. flavescenti-tomentosis 3-4 lin. longis suffulti, paniculas breves terminales dense tomentosae efficientes; calyx ½-¾ poll. longus v. brevior, campanulatus, usque ad medium fissus,

distincte 3- v. 2-lobatus v. dentatus, extus cinerascens-tomentosus, intus glaber; corolla infundibuliformis, glaberrima, tubo pollicari v. longiori, lobi patentes tubo plus quam duplo longiores, undulato-crispati; capsulæ usque 2 pedales, iis *Spathodeæ stipulatæ* assimilæ, elongato-lineari-oblongæ, compressiusculæ, dense fumoso-tomentosæ, septo brevi et valde reducto, medio septo instar dilatato; semina elongato-membranaceo-alata, c. 2 poll. longa.—*Prome, Pegu.*

181. *SPATHODEA IGNEA*, Kurz, in Journ. As. Soc. Beng. vol. XL, p. 77 descripta, potius generis novi typum præbet. calyce tantum usque ad medium fissio circumscisse deciduo spathaceo, filamentis usque ad medium corollæ adnatis, antherarum loculis parallelis, nec non foliis decompositis a *Spathodea* distingui potest et sub nomine *Mayodendri* (in honorem viri nobilissimi Mayo, proregis infausti Indiæ orientalis, dictum) in narratione mea officiali de sylvis Burmanicis fusius descripsi et iconibus illustravi.

182. *STEREOSPERMUM NEURANTHUM*, nov. sp.

Arbor mediocris, novellis molliter pubescentibus; folia impari-pinnata, juniora præsertim subtus pubescentia, 1-1½ ped. longa; foliola 3 v. 2-juga cum impari longe petiolato, basi subinæquali acuta v. obtusa, petiolulo crasso 1-2 lin. longo suffulta, obtusiuscula v. obtusiuscule apiculata, 2-4, nonnunquam usque ad 5-6, poll. longa, integra, rigide chartacea, juniora subtus canescenti-tomentosa denuo magis minusve scabrescentia, supra scabrescentia glabrescentia et subrugulosa; flores conspicui, pallide lilacini v. cyanescenti-albi, atropurpurco-venosi, pedicellis 4-7 lin. longis pubescentibus apicem versus bibracteolatis, in paniculam breviusculam subcymiformem pubescentem terminalem dispositi; calyx c. 4 lin. longus, pubescens, breviter 4-lobus; corolla campanulato-infundibuliformis, subcurva, puberula, lobis leviter undulato-crispatis; capsulæ elongato-lineares, cylindrico-4-gonæ, glabræ, 1-1½ ped. longæ; semina et septum uti in *S. chelonioide*.—*Pegu.*

### ACANTHACEÆ.

183. *RUELIA FLACCIDA*, nov. sp.

Herba debilis, pilosa, ramosa et suberecta, 1½-2 pedalis, caulibus longe et patenter pilosis; folia ovata, basi contracta et in petiolum gracilem pilosum ½-1 poll. longum attenuata, obtusa, 1½-2 poll. longa, membranacea, obsolete crenato-dentata, præsertim supra parce pilosa; flores parvisculi, pallide cœrulei, inter bractæas foliaceas obovato-oblongas obtusas v. emarginatas pilosas fimbriatas vulgo solitarii et sessiles; calyx 3 lin. fere longus, lobis linearibus, ciliatis et pilosis; corolla c. 6 lin. longa, tubuloso-infundibuliformis, glabra, tubo breviusculo, lobis brevibus rotundatis; stamina 4, filamenta longe pilosa; stylus simplex, 6 lin. fere longus, glaber; ovarium glabrum.—*Pegu.*

184. *RUELLIA MACROSIPHON*, nov. sp. (R. sp. T. And. in Linn. Proc. IX. 461 in nota).

Herba perennis? subsimplex, 2-3 pollicaris, caulibus hirsutis, novellis pilis albis crispis sublanuginosis; folia lineari-lanceolata v. linearia, c. 2 poll. longa, acuminata, in petiolum brevissimum attenuata, integra, membranacea, ciliata, utrinque præsertim secus nervos hirsutula; flores magni, solitarii, sessiles, bracteis 2 foliaceis pedunculum brevem axillarem terminantibus insidentes; bracteæ lineari-lanceolatæ, calyce pluries longiores, structura et indumento foliis similes; calycis segmenta lineari-subulata, c.  $2\frac{1}{2}$  poll. longa, minute puberula; corolla tubuloso-infundibuliformis, c. 2 poll. longa, extus parce pilosula, lobis magnis rotundatis, tubo pollicari gracili in corollæ partem efflatam sensim ampliata; stylus longissimus, parce hirsutus; stamina 4, subæquilonga, inclusa; filamenta gracilia, parce hirsuta.—*Prome?* (Col. Eyre). *R. suffruticosa*, Roxb., arcte affinis.

185. *STROBILANTHES* (HEMIGRAPHIS) BURMANICA, nov. sp.

Herba decumbens ramosissima pilis albis patentibus cum glanduliferis intermixtis vestita, cauli ramisque 4-gonis; folia ovata ad ovato-lanceolata, basi in petiolum  $\frac{1}{2}$ -2 poll. longum pilosum angustata, obtusiuscula,  $1\frac{1}{2}$ -2 poll. longa, membranacea, crenato-dentata, utrinque parce pilosa; flores pallide cyanei, passim solitarii et axillares, frequentius autem in spicas longiores v. breviores foliaceo-bracteatas pilosas pedunculatas axillares et terminales digesti; bracteæ ovato-lanceolatæ, obtusiusculæ, integræ, parce pilosæ et longo ciliatæ, inferiores usque ad 7 lin. longæ; bracteolæ nullæ; calyx pilosus, segmentis linearibus 4 lin. longis; corolla rugata, 6 lin. circiter longa, glabra, ore pubescens, sensim in tubum attenuata, lobis obtusis rotundatis; antheræ 2-loculares, pallide violaceæ; filamenta crassa, piloso-barbata; stylus inæquali-2-fidus; capsulæ 4 lin. longæ, compresso-4-gonæ, obovato-lineares, acutæ, glabræ, a basi fere 8-spermæ; semina plus quam  $\frac{1}{2}$  lin. in diametro, anguste marginata.—*Ava, Prome, Pegu. S. (Hemigraphidi) Palala*, quacum cl. T. Anderson confudit, affinis.

186. *STROBILANTHES* (HEMIGRAPHIS) GLANDULOSA (*Hemigraphis glandulosa*, T. And. MS. in Kurz, And. Rep. App. B. 13.)

Herba ramosa, glanduloso-puberula; folia lanceolata v. oblongo-lanceolata, obtusiuscule acuminata, in petiolum glandulosum brevem attenuata, 2-2 $\frac{1}{2}$  poll. longa (superiora minora) repando-dentata, præsertim subtus secus costam glanduloso-puberula, supra glabrescentia; flores parviusculi, pulchre lutei, in axillis bractearum foliacearum vulgo solitarii, spicas 1 v. 2 axillares et terminales interruptas longe-pedunculatas foliaceo-bracteatas efformantes; bracteæ foliis caulinis similes sed multo minores, obtusæ, superiores sensim minores; bracteolæ calyce breviores, obovato-oblongæ, viscoso-hirsutæ; calycis segmenta lineari-spatulata, obtusa, glanduloso-hirta, c.  $2\frac{1}{2}$

lin. longa; corollā c. 3. lin. longa, campanulato-infundibuliformis, tubo brevi extus puberulo intus lævi, lobis rotundatis; stylus et filamenta glabra; capsulæ clavatæ, compressiuscule 4-gonæ, calycis longitudine v. paullo longiores, apiculatæ, glanduloso-puberulæ, abortu vulgo 2-3-spermæ.—*Andamans.* Ex affinitate *S. (Hemigraphia) Griffithiana*.

187. *STROBILANTHES NEESII*, nov. sp.

Frutex magnus, 10-12 pedalis, ramulis puberulis glabrescentibus; folia lanceolata ad oblongo-lanceolata, breve acuminata, in petiolum  $\frac{1}{2}$ -1 $\frac{1}{2}$  poll. longum attenuata, obsolete repando-dentata, 5-7 et sæpius, usque ad 10 poll. longa, membranacea, utrinque pilis minutis adpressis adspersa, subtus secus costam puberula; flores majusculi, in spicas densas bracteatas sessiles denuo elongatas laxas interruptas axillares et terminales dispositi; bracteæ inferiores v. potius folia floralia foliaceæ, valde caducæ, c.  $\frac{1}{2}$  poll. longæ v. longiores, setis brunneis ciliatæ, apicem versus fissæ et serratæ; bracteæ veræ oblongo-lineares, calyce breviores, apicem versus vulgo parce serratæ, acuminatissimæ, glanduloso-pilosæ; bracteolæ 2, calycis longitudine, lineari-lanceolatæ, acuminatæ, basi attenuatæ, glanduloso-hirsutæ; calycis segmenta c. 6 lin. longa, v. longiora, linearia, canescentia, ciliata, acumen versus sæpius glanduloso-hirsuta; corolla 1 $\frac{1}{2}$ -1 $\frac{3}{4}$  poll. longa, purpurea, extus glabra, intus fauce secus plicam duplicatam pubescens, tubo longo et gracili; stamina 2 (?); filamenta glabra, filiformia, alte adnata; stylus hirsutus; capsulæ lineari-clavatæ, calyce paullo longiores, glabræ, acumine parce hirtulæ, 4-spermæ; semina sericea.—*Martaban. S. fimbriatæ*, N. E., maxime affinis, sed indumento glanduloso nigrescente, corolla et filamentis glabris differt.

188. *STROBILANTHES FETIDISSIMA*, nov. sp.

Herba ramosa, caulibus divaricatis subteretibus, plus minusve dense fulvo-pilosa; folia ovata, basi in petiolum longum gracilem fulvescenti-pilosum attenuata, acuminata, membranacea, 3-5 poll. longa, serrato-dentata, utrinque albido v. ochrascenti-hirsuta; flores cyanei, conspicui, spicam laxiusculam brevem albido-pubescentem pedunculo brevi axillari dense fulvescenti-hirsuto suffultam v. subsessilem efformantes; bracteæ obovato-cuneatæ, c. 8 lin. longæ, obtusæ, herbacæ, glanduloso-hirsutæ; bracteolæ bracteis conformes sed angustiores et subbreviares; calyx bractearum longitudine, adpresso glanduloso-puberulus, segmentis profunde lobulatis; corolla 1 $\frac{1}{2}$  poll. fere longa, glabra; filamenta glabra; stylus hirsutus; capsulæ c. 8 lin. longæ, glaberrimæ; semina fere 2 lin. in diametro, adpresso villosa.—*Martaban. S. rufescenti* affinis.

189. *STROBILANTHES PTEROCAULIS*, nov. sp.

Herba annua, robusta, erecta, ramosa, sparse hirsuta, caulibus crassiusculis quadrangulato-alatis, alis herbaceis dense fimbriatis; folia 8-12 poll.

longa, obovato-oblonga, basi angustato-cuneata ciliata in petiolum crassum brevissimum (2-3 lin.) decurrentia, breve acuminata, crenato-dentata, membranacea, utrinque plus minusve hirsuta; flores parvi, flavescentes, spicas breves dense bracteatas glandulosas 3-4-nas in paniculam axillarem dispositi; pedunculi et ramificationes acute 4-angulati, anguste alati, et dense hirsuto-ciliati; bracteæ obovato-cuneatæ, obtusæ, 3-4 lin. longæ, glanduloso-fimbriatæ et apice pilis hyalinis articulatis glanduloso-hirsutæ; bracteolæ 2, calycis longitudine, obovato-linearia, apice glanduloso-hirsutæ; calycis segmenta linearia, obtusiuscula, 3 lin. fere longa, hyalino-chartacea, apice parce glanduloso-hirsuta; corollæ omnes casæ; capsulæ calycis longitudine v. paululo longiores, lineari-oblongæ, 4-angulares, apice hirsutæ, 4-spermæ.—*Pegu. St. imbricatæ*, NE., affinis.

190. STROBILANTHES KARENSIUM, nov. sp.

Herba perennis, ramosa, magis minusve albo-hirsuta; folia caulina inferiora brevissime petiolata, superiora subsessilia, ovata, brevissime acuminata, membranacea, crenata, utrinque hirsuta, 2-3 poll. longa v. longiora; spicæ breves, densiusculæ, infra basi foliolis nonnullis floralibus subsessilibus hirsutissimis sustentæ, pedunculo stricto hispido terminali v. axillari suffultæ; bracteæ lineares, c. 4 lin. longæ, obtusiusculæ, dense glanduloso-pubescentes; bracteolæ lineari-subulatæ, glanduloso-pubescentes; calyx subscariosus, bracteolarum longitudine, segmentis lato-linearibus albedo-marginatis sursum pubescentibus; corolla cyanea, pollicem fere longa, glabra; filamenta secus partem adnatam hirsuta; capsulæ bracteolarum longitudine, dorso pubescentes.—*Martaban.* Habitu *S. acrocephali*, characteribus essentialibus autem *S. glomeratæ* proxima.

191. S. SUBFLACCIDA, nov. sp.

Herba gracilis, glabra, caulibus obsolete 4-gonis sulcatis; folia lanceolata ad oblongo-lanceolata, acuminata, basi in petiolum  $\frac{1}{2}$  poll. longum attenuata, repando-dentata, flaccida, membranacea, 5-6 poll. longa, supra glabra subtus pilis minutis adpressis albidis adpersa; spicæ dense et minute adpresse hirsutæ; bracteæ lato-obovato-oblongæ ad oblongæ v. obovato-lanceolatæ, obtusissimæ v. emarginatæ, minute puberulæ, enerviæ, (purpureo?) coloratæ, c. 2 lin. longæ; bracteolæ paullo breviores, minus obovatæ, 1-nerviæ, minute adpresse pubescentes; calyx bilabiatus, labio superiore glabro usque ad  $\frac{1}{2}$ , partem trilobo, lobis obtusis obsolete ciliatis, labio inferiore fere usque ad basin bifido, lobis linearibus obtusis, 1-nerviis extus minute pubescentibus; capsulæ 2-2 $\frac{1}{2}$  lin. longæ, calycem non superantes, clavato-oblongæ, glabræ.—*Tenasserim.* (Helf. 6114).

192. STROBILANTHES DASYSPERMA, nov. sp.

Herba erecta, ramosa, subglabra, 3-4 pedalis; folia inferiora magna, 6-8 poll. longa, oblongo-lanceolata ad lanceolata, basi cuneata in petiolum bre-



viusculum decurrentia, acuminata, serrato-dentata, membranacea, ciliata et supra pilis raris brevibus adpersa, subtus glabra et subglaucescentia; superiora caulina multo minora et basi magis rotundata, v. cordata, ovata, haud decurrentia, breve petiolata v. summa sessilia; flores cyanei, in capitula parva glanduloso-puberula pedunculata congesti, paniculam spuriam terminalem glanduloso-puberulam efformantes; bracteae parvae, oblongae, acutae, glandulosae; calyx glandulosus, segmentis linearibus 3 lin. fere longis; corolla glabra, infundibuliformis, poll. fere longa; filamenta et stylus sparse pilosi; capsulae calycis longitudine, obovato-4-gonae, glanduloso-pubescentes, 4-spermæ, seminibus stupposo-villosulis.—*Pegu.* Habitu *S. Berhaavioidis*, T. And., assimilis, floribus capitatis &c., autem in vicinatem *S. pentstemonoidis*, T. And., referenda.

193. *BARLERIA STENOPHYLLA*, nov. sp.

Herba perennis, inermis, 1-1½ pedalis, subglabra, ramis erectis gracilibus, omnibus partibus plus minusve nitentibus; folia anguste linearia, 3-4 poll. longa, c. 2 lin. lata, spinescenti-acuta, subsessilia, coriacea, integra, supra adpresse hirsutula et sublucida; flores magni, sessiles, fasciculati, bracteati axillares et terminales; bractea lucida, rigida, ovato-lanceolata, pungenti acuminata, spinescenti-ciliata, extus secus costam adpresse hirsuta; sepala exteriora oblonga, apice 2-fida, rigide ciliata, poll. fere longa, glabra; interiora brevissima, lineari-lanceolata, adpresse pubescentia; corolla circ. 2-pollicaris, puberula, cyanea?, tubo gracili sesquipollicari, lobis 8 lin. longis, rhomboideo-oblongis apiculatis crenatis; capsulae desunt.—*Ava* (Dr. J. Anderson).

194. *NEURACANTHUS GRANDIFLORUS*, nov. sp.

Herba divaricata v. suberecta, subrigida, ramis retrorse-hirsutis v. lineis 2 v. 4 retrorse villosis notatis; folia parva, 1½-2 poll. longa, vulgo obovata v. oblonga, obtusiuscula v. breve acuminata, basi in petiolum brevissimum latum attenuata v. superiora subsessilia, obsolete dentata, membranacea, glaberrima; flores majusculi, pallide v. intense cyanei, spicas elongatas densas v. laxas subtetragonas hirsutas rigide-bracteatas ex foliorum axillis v. e rhizomate protrusas efficientes; bractea ovato-lanceolata, rigida, 5-nervia, pubescentes et hirsutae, acuminatae, pungentes; calyx bilabiatus, pubescens, secus segmenta linearia parce pilosus, prominenter 5-costatus; corolla ½ poll. longa, rugata, lobis obtusis; capsula tetragono-lanceolata, acuminata, glabra, 3 lin. longa, 4-sperma; semina sericeo-splendentia.—*Prome.*

195. *NEURACANTHUS SUBUNINERVIS*, nov. sp.

Herba erecta, probabiliter 1-2 ped. alta; folia adulta &c., ignota; flores albi, parvi, in spicas laxiuscule-bracteatas subtetragonas glandulosas et parce pilosas e rhizomate protrusas digesti; bractea lanceolata, pungenti-acuminata, rigide membranacea, c. 3 lin. longa, concava, medio prominenter

costatæ, costis autem 4 lateralibus obsoletis, glanduloso-puberulæ, secus nervos pilosæ; bracteolæ bractearum longitudine, falcato-lineares, sub-8-nerviæ, acuminatæ, glanduloso-puberulæ et piloso-ciliatæ; calyx profunde, fere usque ad basin, 5-fidus, nervis evanidis, glanduloso-puberulus et piloso-ciliatus, lobo superiore majore c. 4 lin. longo, lineari, acuto, lobis lateralibus paullo brevioribus, subulatis, 2 inferioribus basi tantum connatis et angustioribus; corolla alba, intus præsertim ad labellum brunneo-maculata, extus puberula, 4 lin. fere longa, tubo 2 lin. longo; labium superius emarginatum, marginibus reflexum, inferius 3-lobum, lobis oblongis rotundatis mediano sub-breviori; antherarum loculi compressi, barbatae, obliquæ; filamenta brevissima, fauci inserta; reliqua ignota.—*Prome.*

196. *LEPIDAGATHIS STROBILINA*, T. And. MS.

Herba 1-2-pedalis, glabra caulibus teretibus elevato-4-lineatis; folia lanceolata, basi cuneata in petiolo decurrentia, acuminata, membranacea, integra, 7-8 poll. longa, glabra et nitentia; capitula florum laxa, terminalia, majora; bractæ c. poll. longæ, oblongo-lanceolatæ, acuminatæ, tenuiter chartaceæ purpureo-lilacino-tinctæ, 1-nerviæ et reticulatæ, glanduloso-puberulæ; bracteolæ bracteis conformes, angustiores; calyx magnus; corolla magna, purpureo-lilacina, poll. fere longa, infundibuliformis, tubo brevi; capsulæ desunt.—*Martaban.* (Revd. Parish).

197. *JUSTICIA DASYCARPA*, nov. sp.

Herba ramosa, 1½-3 pedalis, subglabra, caulibus sæpius lineis 4 hirtulis notatis; folia ovata, passim subobliqua, in petiolo gracili longo decurrentia, 3-5 poll. longa, breve acuminata, integra, membranacea; pilis minutis adpressis scabra; flores parvi, candidi, spicas breves laxè bracteatas solitarias axillares v. plures terminales efformantes; bractæ ovatæ ad ovato-orbiculares, brevissime acuminatæ, 3-4 lin. longæ, membranaceæ, virides, sparse ciliatæ; bracteolæ calyce paullo longiores, lineari-lanceolatæ, puberulæ; calyx 1½ lin. longus, puberulus, lobis lineari-lanceolatis acuminatis; corolla 3½-4 poll. longa, labio superiore oblongo obtuso, inferiore 3-lobo; antheræ albæ; capsulæ fere 4 lin. longæ, clavatæ, dense puberulæ, 4-spermæ; semina verruculoso-aspera.—*Martaban.* *J. Atkinsonianæ*, T. And., affinis, sed floribus longe distat.

198. *JUSTICIA CALONEURA*, nov. sp.

Herba perennis, erecta, glabra, 2-3 pedalis; folia elliptico-oblonga ad lanceolata, acuta v. acuminata, basi cuneata et secus petiolum totum foliaceo decurrentia, 6-8 poll. longa, integra v. subintegra, membranacea, glabra v. subtus secus nervos laterales numerosos approximatos fugaciter adpressæ puberula; spicæ glabræ, terminales, pedunculis brevissimis v. sessiles; bractæ decussatim oppositæ, sub-or biculares, acutæ v. apiculatæ, ciliatæ, c. ¼ poll. longæ, virides et nervosæ; bracteolæ lineari-lanceolatæ, acuminatæ; calycis

segmenta linearia, minute pubescentia; corolla  $\frac{1}{2}$  poll. longa, extus puberula, intus secus filamentorum bases adnatas villosa, straminea, labio inferiori 3-lobo obscure-striato, labio superiore paullo longiore, concavo, 2-denticulato; capsulæ desunt.—*Martaban.* Præcedenti affinis.

199. *JUSTICIA FLAVA*, nov. sp.

Herba 2-3 pedalis, erecta, ramosa, subglabra, ramis (præsertim superioribus) 6-5-gonis, parce hirsutulis; folia ovata ad ovato-lanceolata, basi angustata et in petiolum longiorem v. breviorē indistincte hirsutum decurrentia, acuminata, 4-6 poll. longa, integra, membranacea, siccando nigrescentia, utrinque pilis raris brevibus adspersa; flores lutescentes, pedicellis brevissimis, in racemos breves cymæformes paucifloros glabros axillares petioli circiter longitudinis dispositi; bracteæ et bracteolæ remotæ, lineares, parvæ, glabræ; calyx glaber, c.  $1\frac{1}{2}$  lin. longus, lobis lineari-lanceolatis, acuminatis; corolla c.  $3\frac{1}{2}$ -4 lin. longa extus secus venas pubera, tubo brevi, labio superiore concavo, inferiore 3-lobo, faucem versus rugato, lobis rotundatis; filamenta glabra; anthera inferior calcarata; capsulæ clavatæ, tumidæ, acutæ, glabræ  $\frac{1}{2}$  poll. fere longæ, 4-spermæ; semina minute rugulosa.—*Martaban.*

200. *DICLIPTERA SPECTOSA*, nov. sp.

Herba annua, erecta, ramosa, 1-3 pedalis, pilosa, caulibus sub-teretibus lineis 4 elevatis notatis plus minusve glabrescentibus; folia ovata ad ovato-oblonga et lanceolata, in petiolum pilosum v. substupposo-ciliatum 1-2 poll. longum decurrentia, breve acuminata, 5-7 poll. longa, integra, membranacea, utrinque pilis crispatis adspersa; flores albi, raro pallide cyanei, in cymas brachiatas longius v. brevius pedunculatas glanduloso-pubescentes v. pilosas congregati et paniculam magis minusve compositam efficientes; bracteæ obovato-lineares, obtusæ (v. in var.  $\beta$  acutæ), c. 3-4 lin. longæ; bracteolæ dimidio breviores, lineari-subulatæ; calyx bracteolis vix brevior, minute puberulus, segmentis subæqualibus, lineari-subulatis et minute ciliolatis; corolla 7-8 lin. longa, resupinata, tubo  $2\frac{1}{2}$  lin. fere longo, labio superiori lineari-lanceolato, obtuso, lobo mediano brevi reflexo, labio inferiore 3-lobo, cymbiformi-complicato, lobis 2 lateralibus horizontaliter patentibus rotundatis; antheræ superpositæ, albæ; capsulæ lato obovato-cuneatæ, glanduloso-puberulæ, c. 4 lin. longæ, 4-spermæ; semina verruculis minutis flavescentibus aspera.—*Pegu.*

*Var. a. genuina*, bracteæ obtusæ, glanduloso-puberulæ; caules glabrescentes; corolla alba, labio inferiore coccineo-punctato; pedunculi glanduloso-puberuli, breviores (forma umbrosa).

*Var.  $\beta$ . pilosa*, caules, inflorescentia &c., patenter-pilosa; bracteæ lineares acutæ, pedunculi vulgo longiores; corolla præcedentis, raro pallide cyanea, intus atropurpureo-maculata, (forma arida, an species?)

Acanthacearum genera in regno Burmanico adhuc observata secundum systema Neesianum paullisper mutatum sic distinguenda :

Subord. I. THUNBERGIEÆ. *Calyx ad annulum dentatum v. nudum reductus.* Corolla 5-loba, subregularis. Antheræ 2-loculares, loculis parallelis. Semina globosa, placentæ cupulari insidentia. *Capsulæ rostratæ.*

1. *Thunbergia*, L. F. Genus unicum. Herbæ v. frutices scandentes raro suberecti.

Subord. II. ACANTHACEÆ. *Calyx bene evolutus, 5-partitus -fidus v. -dentatus, regularis v. irregularis.* Corolla varia. Antheræ 2 v. 1-loculares, loculis parallelis, obliquis v. superpositis. Semina compressa, raro globosa, retinaculis uncatis v. glanduliformibus sustenta. *Capsulæ non rostratæ.* Herbæ v. frutices sæpius erecti, raro scandentes v. prostratæ.

Trib. 1. ACANTHEÆ. *Calyx inæqualis. Corolla fissâ in labellum unicum magnum expansa. Antheræ 1-loculares, v. eæ paris inferioris oblique 2-loculares.* Capsulæ a basi seminiferæ. Semina compressa, retinaculis uncatis sustenta.

\* Corolla in labellum magnum expansa, lobis superioribus omnino suppressis v. rudimentariis, tubus brevissimus v. nullus.

2. *Acanthus*, L. Spicæ  $\infty$ -floræ. Antheræ omnes 1-loculares.

2. *Blepharis*, Juss. Spicæ unifloræ; flores bracteis pluribus sæpius spinosis sterilibus circumdati. Antheræ paris inferioris 2-loculares.

\*\* Corollæ tubus longus, limbus 5-lobus usque ad tubum fissus.

4. *Crossandra*, Salisb. Bractæ inermes, in acumen spinosam productæ.

Trib. 2. RUELLIEÆ. *Calyx magis minusve irregularis, sæpius bilabiat.* Corolla infundibuliformis, hypocraterimorpha v. raro ringens. Stamina 4 v. 2; *antheræ 2-loculares, loculis parallelis, rarissime obliquis (nec autem superpositis).* Capsulæ basi sterili attenuatæ v. a basi seminiferæ. Semina compressa, retinaculis uncatis sustenta.

\* *Barleria* Calyx 3-partitus, sepalis decussatis, 2 exterioribus sæpius majoribus. Capsulæ a basi seminiferæ.

5. *Barleria*, L. Corolla infundibuliformis. Stamina 4, raro 5, quorum 2 v. 3 sæpius sterilia et rudimentaria; antherarum loculi paralleli.

\*\* *Neuracanthæ.* Calyx 5-fidus, irregularis, v. bilabiatus, v. segmento superiori tantum maximo. Corolla bilabiata

et ringens, v. infundibuliformis. Antherarum cellulae parallelæ v. obliquæ. Capsulæ a basi seminiferæ.

- Calyx bilabiatus. Capsulæ dissepimenta non secedentia. Spicæ rigidæ v. scariosæ, vulgo 4-stichæ.

6. *Neuracanthus*, N. E. Stamina 4; antherarum loculi obliqui. An potius cum genere sequenti conjungendum?

7. *Lepidagathis*, Willd. Stamina 4; antherarum loculi paralleli.

- Calycis segmentum superius maximum et bracteiforme. Capsulæ dissepimenta in lamellas 2 seminifera secedentia.

8. *Phayloopsis*, Willd. Stamina 4; antherarum loculi paralleli. Spicæ breves bracteis membraneis mollibus vestitæ.

- \*\*\* *Ruellinææ*. Calyx 5-fidus, segmentis magis minusve inæqualibus. Corolla infundibuliformis. Stamina 4; raro 2. Capsulæ magis minusve 4-gonæ, cum v. absque basi contracta sterili.

9. *Ruellia*, L.

10. *Hemigraphis*, N. E.

11. *Strobilanthes*, Bl.

} Genera inter se valde affinia postea a me accuratius eruenda.

Trib. 3. ERANTHEMÆ. Calyx regularis, 5-dentatus v. fidus. Stamina 2, raro 4; antheræ 2-loculares, loculis parallelis. Capsulæ 2-4-spermæ, in basin longam sterilem contractæ. Semina compressa, retinaculis uncatis suffulta.

- Spicæ v. paniculæ nudæ, i. e. bracteis minutis, persistentibus.

12. *Asystasia*, Bl. Corolla infundibuliformis, in tubum longiusculum v. rarius longissimum attenuata. Flores omnes fertiles. Capsulæ vulgo 4-spermæ.

13. *Eranthemum*, L. Flores 2-5-morphi, fertiles minuti, clausi v. aperti; steriles speciosi, hypocraterimorphi, limbo subregulari tuboque longissimo.

- Spicæ foliaceo-bracteatae, bracteis nonnunquam deciduis.

14. *Daedalacanthus*, T. And. Corolla contorta, hypocraterimorpha, limbo regulari explanato v. complicato, capsulæ vulgo 4-spermæ.

15. *Ecbolium*, Kurz. Corolla imbricata, hypocraterimorpho-bilabiata limbo irregulari, labio superiori reflexo lineari. Capsulæ vulgo 2- raro abortu 1-spermæ, (ovuli in ovarii loculis semper 2).

Trib. 4. JUSTICIÆ. Calyx regularis. Corolla ut plurimum ringens v. bilabiata. Stamina 2; antheræ 2-loculares, loculis superpositis. Capsulæ compresso 4-gonæ, in basin sterilem contractæ. Semina plana, retinaculis uncatis suffulta.

O Corollæ tubus longus, gracilis, limbi lobos longitudine superans.

16. *Rhinacanthus*, *N. E.* Limbi labium superius angustum, erectum. Antherarum loculi haud calcarati.

OO Corollæ ringentis tubus brevis.

17. *Justicia*, *L.* Antherarum loculi inferiores basi mucronati et calcarati. Capsulæ dissepimenta persistentia.

18. *Rungia*, *N. E.* Characteres præcedentis, sed capsulæ dissepimenta a valvis secedentia.

OOO Corolla bilabiata, tubo gracili longitudine loborum v. brevior.

19. *Dicliptera*, *Juss.* Capsulæ dissepimenta a valvis secedentia.

20. *Peristrophe*, *N. E.* Capsulo dissepimenta persistentia.

Trib. 5. APIETANDREÆ. *Calyx regularis.* Corolla bilabiata, Stamina 4; *antheræ 1-loculares*, lineares v. oblongæ. Capsulæ vulgo a basi seminifera. Semina plana, retinaculis uncatis suffulta. Fere omnes Americane, inter Indica genus unicum (*Hypæstes*) hic rite referendum, cætera genera hic relata abnormalia esse videntur, viz. *Monothecium* (*Justiciæ* sect. *Rostellariæ* nimis affine) et *Hypæstes triflora*, Roem. et Schult., calyce a congeneris valde discrepans potius generi *Diclipteræ* adnumeranda, v. generis novi typum præbens. *Haplanthi* genus infra inter *Hygrophileas* quærendum.

Trib. 6. HYGROPHILÆ. *Calyx regularis v. irregularis, 5-fidus v. -dentatus.* Corolla bilabiata ringens. Stamina 2 v. 4; *antheræ 2-loculares*, loculis parallelis. *Capsulæ planiusculæ v. cylindricæ, sæpius striatæ, sulcatæ v. medio impressæ, a basi seminiferæ.* Semina compressa, retinaculis uncatis suffulta.

O Corolla infundibuliformis et subringens. Capsulæ cylindricæ v. subcylindricæ. Stamina 4 v. 2.

21. *Phlogacanthus*, *N. E.* Capsulæ 8-∞-spermæ; stamina 4, fertilia.

22. *Cystacanthus*, *T. And.* Characteres præcedentis, sed stamina fertilia 2, cum 2 rudimentariis.

23. *Graptophyllum*, *N. E.* Capsulæ 4-spermæ. Stamina 4, omnia fertilia.

OO Corolla ringens. Stamina 2. Capsulæ planiusculæ, sursum sæpius latiores.

Antheræ basi sæpius barbatae v. villosæ. Racemi v. paniculæ nudæ.

24. *Andrographis*, *Wall.* Antheræ 2-loculares.

25. *Haplanthus*, *N. E.* Antheræ 1-loculares.

\*\* Antheræ nudæ.

26. *Hemiadelphis*, *N. E.* Spicæ conspicue bracteata.

OOO Corolla bilabiata v. ringens. Stamina 4. Capsulæ magis minusve teretes, sæpius sulcata.

27. *Hygrophila*, *R. Br.* Calyx tubulosus, regularis. Corolla bilabiata.

28. *Nomaphila*, *Bl.* Calyx usque ad basin 5-fidus. Corolla ringens.

Trib. 7. *NELSONIE* *E.* Calyx 5-fidus, ut plurimum subirregularis. Corolla infundibuliformis v. personata. Stamina 2 v. 4; antheræ 2-loculares, loculis parallelis. Capsulæ a basi seminifera. Semina minuta, *globosa, retinaculis glanduliformibus suffulta, v. iis omnino deprivata.*

() Stamina 2.

29. *Nelsonia*, *R. Br.* Corolla ringens.

OO Stamina 4.

30. *Elbermaiera*, *N. E.* Corolla ringens.

31. *Cardianthera*, *Ham.* (*Adnosma*, *N. E.* non *R. Br.*) Corolla personata.

### *VERBENACEÆ.*

201. *VITEX CANESCENS*, nov. sp.

Arbuscula 25—35 pedalis, partibus omnibus junioribus canescenti v. gilvescenti-pubescentibus; folia digitatim 3—5—foliolata, petiolo 1—2 pollicari tomentello suffulta; foliola sæpius breve (intermedio multo longius) petiolulata, ovata v. ovato-lanceolata, ad elliptica et elliptico-lanceolata, acuminata v. acuta, basi attenuata, integra, v. raro crenato-serrata, membranacea, juniora utrinque dense canescenti-pubescentia, supra denuo scabrescenti-puberula; flores albi, parvi, pedicellis gracilibus 1—2 lin. longis tomentellis suffulti, glomerati, paniculas cinereo- v. gilvescenti-tomentellas compositas v. simplices terminales et supra foliorum delapsorum ortas efficientes; calyx cinereo-pubescons, lin. circiter longus, 5-dentatus; corolla calyce duplo longior, extus tomentosa; drupæ obovoides, læves, pisi magnitudinis, calyce magis minusve explanato insidentes.—*Prome. V. Negundo*, L., affinis, differt inprimis floribus graciliter pedicellatis.

### *LAURINEÆ.*

202. *MACHILUS FRUTICOSA*, nov. sp.

• Frutex glaber, gemmis velutinis; folia ovato ad ovato-oblonga, 2½—4 poll. longa, basi rotundata subdecurrentia, petiolo crasso lato 2—5 lin. longo, glabra, rigide coriacea, obtusa et passim rotundata, marginibus recurvis, subtus glauca, nervis, simul cum reticulatione copiosa, prominentibus;

flores...; paniculæ folio longiores, glabræ, longe-pedunculatæ; pedicelli sub fructu brevissimi (1—1½ lin. longi) et incrassati uti in *Phæbe*; perianthium minute adpresse pubescens, segmentis patentibus oblongis obtusis; fructus globosi, glabri, pisi magnitudinis.—*Martaban* (Dr. Brandis).

203. *TETRANTHERA* (CYLICODAPHINE) *CALOPHYLLA*, nov. sp.

Arbuscula, novellis fulvescenti-tomentellis; folia ovato-oblonga ad lanceolata, basi acuta v. acuminata, longius v. brevius acuminata, petiolo ½—1 poll. longo magis minusve tomentoso suffulta, rigido membranacea, 3½—7 poll. longa, supra lutescenti-viridia et (costa immersa excepta) glabra, subtus pallida, tomentella, penninervia, prominenter reticulata; flores in umbellam parvam bracteatum congesti; umbellæ pedunculo 2½—3½ lin. longo tomentello solitario axillari suffultæ v. secus ramulum novellum axillarem fulvo tomentosum quasi racemiformem digestæ, raro in racemum verum brevem corymbiformem pedunculo fulvescenti-puberulo suffultum efformantes; involucri foliola concavo-rotunda, puberula; perianthium extus pubescens; filamenta glabra; antheræ 4-locellatæ; hæcæe oblongo-ovatæ, ½ poll. fere longæ, læves, carnosæ, cupulâ majusculâ truncatâ extus minute pubescenti in pedicellum brevem crassum attenuatâ suffultæ.—*Martaban, Tenasserim.* Species quoad folia et inflorescentia variabilis, *Cylicod. Wightianæ, N. E.*, arcte affinis ejusve probabiliter varietas insignis?

204. *TETRANTHERA* (CYLICODAPHINE) *NUCULANEA*, nov. sp.

Frutex ramulis teretibus tomentosis; folia obovato-oblonga ad oblongo-lanceolata, petiolis 4—5 lin. longis pallide-tomentosis suffulta, basi acuta, 5—6 poll. longa, obtusiuscule apiculata, crasse chartacea, supra glabra, subtus glauca et plus minusve dense puberula, reticulatione inter nervos laterales crassiusculos tenui sed conspicua; flores.., apparenter umbellas subsessiles axillares formantes; pedunculus in speciminibus fructigeris crassissimus vix 3 lin. longus; fructus pallide straminei, oblongi, c. 6—7 lin. longi, læves, cupula integra magna carnosâ suffulti.—*Tenasserim.* (Rev. Parish).

205. *TETRANTHERA* (CYLICODAPHINE) *ALBICANS*, nov. sp.

Arbuscula, novellis minute puberulis; folia oblongo-lanceolata ad lanceolata, basi attenuata, petiolo 5—8 lin. longo gracili subglabro suffulta, breve acuminata, chartacea v. tenuiter coriacea, 6—10 poll. longa, glabra, subtus albida, reticulatione inter nervos tenues prominentes tenui sed conspicua; umbellæ involucriatæ, velutino-tomentosæ, pedunculo gracili c. 4 lin. longo canescenti-tomentoso suffulti, in racemum abbreviatum v. subsessilem velutino-tomentosum axillarem v. vulgo supra foliorum delapsorum cicatricibus orientem dispositi; involucri phylla canescenti-velutina; fructus..; cupula



magna, carnosâ, undulato-lobata, in pedicellum crassum attenuata. — *Pegu.*  
*Ex affinitate T. Panamoje, N. E.*

206. *LITSÆA LEIOPHYLLA*, nov. sp.

Arbor inflorescentiis exceptis glaberrima; folia lanceolata v. oblongo-lanceolata, 5—6½ poll. longa, basi subinæquali acuminata, petiolo gracili 1—1½ pollicari glabro suffulta, obtuse acuminata, tenuiter coriacea, glaberrima, supra lucida, subtus vix glaucescentia, supra basi triplinervia et penninervia, obsoletissime reticulata; flores fulvo-villosi, pedicellis brevibus tomentosis suffulti, racemos axillares petiolo breviores abbreviatis fulvo-villosos simplices forinantes; filamenta glabra; baccæ desunt. *Tenasserim v. Andamans.* (Helf. 4330).

207. *DAPHNIDIUM ARGENTEUM*, nov. sp.

Arbor parva, novellis argenteo-sericeis; folia lanceolata v. lato-lanceolata, utrinque acuminata, petiolo 3—5 lin. longo argenteo-pubescente glabrescente suffulta, 3½—6½ poll. longa, crasse chartacea, supra glabra, subtus adpresse argenteo-sericea, penninervia, utrinque laxè reticulata; flores virescenti-lutei, pedicellis brevissimis tomentosis, in racemum brevem tomentosum basi bracteis concavis pubescentibus involucratum disgesti; perianthium 6-fidum, extus adpresse pubescens; antheræ 2-locellatæ; filamenta subglabra. — *Pegu, Martaban.* — Species insignis, foliorum structura et habitu *Beilschmiedia* genus in mentem revocat.

*PROTEACEÆ.*

208. *HELICIA PYRRHOBOTRYA*, nov. sp.

Arbor?, novellis ferrugineo-villosis; folia obovato-lanceolata, brevè acuminata, versus basin obtusam attenuata, c. pedem longa, petiolis crassis 2—5 lin. longis suffulta, chartacea, grosse serrata, adulta glabra v. subtus secus costam sparse ferrugineo-pubescentia; flores 1—1½ poll. longi, geminati, pedicellis crassis 1½ lin. longis ferrugineo-villosis suffulti, racemos c. pedem longos robustos dense ferrugineo-villosos axillares efficientes; squamulæ hypogynæ ...; ovarium stylusque læves. *Martaban, (Dr. Brandis).*

• *PODOSTEMACEÆ.*

209. *HYDROBRYUM LICHENOIDES*, nov. sp.

Plantulæ minutæ gregaris; rhizoma latum membranaceum, lobatum, terræ v. saxis adpressum, viride, vix ½ lin. latum, 2—3 lin. longum; folia perpauca tantum pedicellorum basi sita, squamæformia; pedicelli filiformes, ½ lin. longi; capsulæ globosæ, c. ½ lin. in diametro, lato-8-costatæ. — *Martaban.* (Revd. Parish).

## URTICACEÆ.

210. *ELATOSTEMA MEMBRANIFOLIUM*, nov. sp.

Suffrutex erectus, ramosissimus, *E. lineolati* habitu, glaberrimus, ramulis 4-quetris, lævissimis; folia alterna, subinæqualia, cum basi inæquali sessilia,  $1\frac{1}{2}$ — $2\frac{1}{2}$  poll. longa, acuminatissima (acumine obtuso et integro), tenuiter membranacea, grosse et obtusiuscule crenato-serrata, utrinque lævia et striis destituta, basi irregulari-triplinervia, nervis tenuibus sed conspicuis, per nervos laterales strictis rectangulares cum costa anastomozantibus; stipulæ minutæ, subulato-lineares; flores minuti, sessiles, capitula (nondum evoluta) parva sessilia in foliorum axillis v. iisdem opposita formantes; perianthium glabrum.—*Tenasserim*, (Dr. Brandis)—*E. lineolato*, Wight, arcte affine, absentia striolarum autem tute distinguendum.

211. *ELATOSTEMA BULBIFERUM*, nov. sp.

Herba monoica v. dioica, erecta,  $\frac{1}{2}$ —1 pedalis, succulenta, simplex v. sub-ramosa, glabra, caulibus teretibus ad internodia bulbiferis; folia opposita, dimorpha, quorum evoluta obliqua, ovata v. ovato-lanceolata, petiolis vix lin. longis suffulta, superiora cum basi inæquali subsessilia,  $2\frac{1}{2}$ — $3\frac{1}{2}$  poll. longa, grosse serrata, herbacea, breve acuminata, glabra, supra striis albis adnatis oblecta, basi triplinervia, passim nervis nonnullis adjectis; folia stipuliformia, lanceolata ad ovato-lanceolata, magis variabilia,  $\frac{1}{4}$ — $\frac{1}{2}$  poll. longa, acuta v. obtusa, integra v. serraturis nonnullis, inferiora vulgo majora; stipulæ minutæ, subulatæ; flores minuti, pedicellati, cymosi; cymii feminei densiores et pedunculis gracilibus brevioribus suffulti; masculi laxi, pedunculo 1—2 pollicari suffulti e tuberibus globulosis crassis axillaribus v. in ramulorum furcationibus sitis subvillosis orti; perianthium glabrum.—*Tenasserim, Arracan.*

212. *ELATOSTEMA GIBBOSUM*, (*Procris gibbosa*, Wall., Cat. 7273).

Herba procumbens, repens, glabrescens, caulibus ascendibus c. semipedalibus florigeris; folio alterna, obovato-oblonga ad trapezoidico-oblonga, subobliqua, cum basi oblique-cordata subsessilia, obtusa v. subobtusa, 2—3 poll. longa, herbacea, grosse rotundato-crenata, supra pilis brevibus albis transverse adnatis adspersa, subtus secus nervos parce pubescentia, basi 3—5-plinervia; stipulæ conspicuæ, membranaceæ, brunneæ, usque ad 3 lin. longæ, lanceolatæ, acuminatæ, persistentes, etiam ex foliorum abortivorum evolutæ; flores masculi majusculi, c. 1 lin. in diametro, subsessiles, in cymam parvam pedunculo  $1\frac{1}{2}$ —2 poll. longo pubescente axillari suffultam collecti; perianthium glabrum.—*Martaban, Tenasserim.*—In vicinitate *E. cornuti* ponendum; an potius generi *Pellionia* adscribendum?

213. *DORSTENIA GRIFFITHIANA*, nov. sp. (D. sp. Griff. Not. Dicot. 403).

Frutex humilis, ramulis angularibus ochraceo-pubescentibus; folia elongato-obovata ad cuneato-elliptica, petiolo crasso  $\frac{1}{2}$ — $\frac{3}{4}$  pollicari pubescente glabrescente suffulta, basi angustata acuta v. rotundata, 8 poll.— $1\frac{1}{4}$  ped. longa, abrupte acuminata, tenuiter coriacea, integra, supra lævia, subtus scabra; stipulæ setacæ, pubescentes; flores monoici, in receptaculis capituliformibus involucreatis extus velutinis pedunculatis congregati; pedunculi velutini solitarii, axillares; involucreum sub 4—6 partitum; syncarpia dimorpha, involucri bracteis reflexis velutinis.—*Tenasserim.*

214. *FIGUS AFFINIS*, Wall., Cat. 4524.

Arbor mediocris, glabra; stipulæ breves, et parvæ, ovato-lanceolatæ, glabræ; folia elliptica ad ovato-oblonga, basi obtusa v. rotundata, obtusiuscule et subabrupte acuminata, 3—4 poll. longa, chartacea, integra v. subundulata, glabra, basi nonnunquam obscure 3-nervia, nervis lateralibus numerosis et subparallelis secus marginem anastomozantibus, utrinque crebre reticulata; receptacula piperis grani magnitudine v. paullo majora, globosa; flavescentia, pustulis obsoletis aurantiacis adspersa, glabra, basi 3-bracteata, pedunculo brevissimo  $\frac{1}{2}$ —1 lin. suffulta, vulgo geminata in foliorum axillis v. supra foliorum delapsorum cicatricibus; bracteo persistentes, minutæ, lato-triangulares.—*Pegu, Tenasserim, Andamans.*—Prope *F. rhododendri-foliam*, Miq., inserenda.

215. *FIGUS GENICULATA*, nov. sp.

Arbor magna epiphytica, ramulis robustis cicatratis novellis pubescentibus; stipulæ lato-ovate, acutæ, glabræ v. canescentes; folia elliptica, elliptico-ovata v. elliptico-oblonga, petiolo 3—4 pollicari apice geniculato inserta, basi obtusa v. acuta, breve et abrupte acuminata v. apiculata, integra, rigide coriacea, utrinque lucida, basi breve 3-nervia, nervis lateralibus subparallelis et magis approximatis sæpius subobsoletis, reticulatione elegante magis minusve obsoleta raro conspicua percursa; receptacula globosa, pisi minimi v. piperis grani magnitudine, flavida, albo-pustulata, glabra, 3—4 bracteata, sessilia v. subsessilia, in foliorum axillis v. supra eorum cicatibus geminata; bracteo persistentes, lato-rotundatæ, brunneæ, glabræ.—*Pegu, Martaban, Tenasserim.*—Ex affinitate *F. infectoria*, Willd.

216. *FIGUS INSIGNIS*, nov. sp.

Arbor mediocris, ramulis crassis cicatratis tomentellis; stipulæ lato-ovate tomentosæ; folia iis *F. geniculata* subconsimilia, elliptica ad ovato-oblonga, petiolo 2—3 poll. longo apice geniculato suffulta, basi rotundata v. obtusa, 5—7 poll. longa, obtuse apiculata, integra v. subundulata, glabra, rigide coriacea, supra lucida, nervis lateralibus subparallelis et moderate approximatis, secus marginem arcuato anastomozantibus, subimpressis, reticulatione elegante vix prominente; receptacula cerasi minimi magnitudine,

globosa v. subglobosa, cinerascenti albida, roscopunctata, dense tomentoso-villosa, basi bracteata, pedunculo crasso brevissimo tomentoso suffulta, in foliorum axillis v. supra eorum cicatricibus vulgo geminata; bracteæ persistentes, lato-ovatæ, scariosæ, brunneæ, glabræ.—*Prome.* Præcedenti affine.

217. *FICUS CALONEURA*, nov. sp.

Arbor glabra; folia iis *F. Rumphii* consimilia, cordato-ovata, sensim obtusiuscule-acuminata, basi cordata, petiolo 3—4 poll. longo apice geniculato bi-glanduloso suffulta, 4—5 poll. longa,  $2\frac{1}{2}$ — $3\frac{1}{2}$  poll. lata, grosse et remote repando-dentata, tenuiter coriacea, glabra, utrinque opaca, supra haud punctata, nervis lateralibus utrumque nervis basilariis omnibus divergentibus et subarcuatis pallidis crassis secus marginem anastomozantibus, nervatione transversali elegante sed tenuiuscula; receptacula desunt.—Burma, sine loco natali, (Dr. Brandis).—Ex affinitate *F. Rumphii*, Bl.

218. *FICUS POMIFERA*, nov. sp.

Frut x scandens, glaber; folia obovata v. sub-rhomboido-obovata, petiolis 3—4 lin. longis scabridis, basi subcuneata, 1— $2\frac{1}{2}$  poll. longa, obtusa v. subemarginata, glabra, coriacea, marginibus subrecurvis, nervis utrinque 4—5 lateralibus paullo prominentibus, in areolis reticulationis obsoletæ lacunosopunctata; receptacula pomiformia v. oblongo-elliptica, c. 1— $1\frac{1}{2}$  poli. crassa, subumbonata, in stipitem brevissimum (c.  $\frac{1}{2}$  lin.) crassum constricta, lævia, miniato-aurantiaca, pedunculo crasso 1—2 lin. longo puberulo suffulta, vulgo solitaria e foliorum axillis v. supra eorum cicatricibus; bracteæ ad pedunculi apicem 3, persistentes, triangulari-ovatæ, subglabræ. Variat.  $\alpha$ . pomiformis, receptacula pomiformia,—*Tenasserim*, (Falconer);  $\beta$ . oviformis, receptacula elliptico-oblonga ad ovoidea,—*Sumatra*.

219. *FICUS PYRRHOCARPA*, nov. sp. (*F. tuberculata*, Wall., Cat. 4539, non Roxb. et aliorum).

Frutex humilis, 1—3 pedalis, ramulis adpressæ brunneo-setosis; stipulæ lineari-lanceolatæ, acuminatæ, glabriusculæ v. dorso pubescentes; folia obversæ lanceolata ad subcuneato-lanceolata, basi cuneata v. acuta, petiolo lineas perpaucas usque ad  $1\frac{1}{2}$  poll. longo adpresso pubescente glabrescente suffulta, breve et obtusiuscule acuminata, integra, crasse membranacea, supra glabra v. pilis minutis inconspicuis adpersa, subtus secus nervos sparse adpresse hirsuta et glabrescentia, nervis arcuatis, reticulatione laxa; receptacula depresso-pyriformia, cerasi magnitudinis, purpurascenti-viridia, costata, squamis nonnullis varie dispositis adpersa, præsertim dum juvenilia pilis rigidis adpressis v. subpatentibus brunneis v. rufis oblecta, pedunculis  $\frac{1}{4}$ — $1\frac{1}{2}$  pollicaribus pubescentibus crassis suffulta, solitaria e trunco subterraneo orta v.

secus surculos aphyllous subterraneos errumpentia ; bracteæ ad apicem pedunculi 3, ovatæ, breves.—*Pegu, Martaban.*—Ex affinitate *F. ischnopodæ*, etc.

219. *FIGUS ANASTOMOZANS*, Wall., Cat. 4513.

Frutex repens, humilis, magis minusve scabro-pubescentia ; stipulæ minutæ, scabræ ; folia oblongo-lanceolata ad lanceolata, basi acuta v. obtusa, petiolo 2—6 lin. longo scabro-pubescente suffulta, magis minusve obtusiuscule-acuminata, 2—4 poll. longa, grosse et irregulariter sinuato-dentata, dentibus rotundatis v. obtusis, membranacea, supra scabro-pubescentia, nonnunquam subglabrescentia, nervis numerosis rectangulari-divergentibus et anastomozantibus ; receptacula ovoidea, piperis grani magnitudinis, umbonata, basi non v. vix constricta, scabro-puberula, pedunculo vix  $\frac{1}{2}$  lin. longo et pubescente suffulta, solitaria c foliorum axillis v. supra eorum cicatricibus errumpentia ; bracteo minutæ.—*Tenasserim.*

220. *FIGUS LEPIDOSA*, Wall., Cat. 4511.

Arbor mediocris, novellis parce pubescentibus ; stipulæ lineari-lanceolatae, acuminatissimæ, glabræ v. subglabræ ; folia obovata ad elliptica, petiolis 1—2 poll. longis parce pubescentibus glabrescentibus suffulta, basi obtusa. breve acuminata, 5—6 poll. longa, crasso membranacea, supra glabra v. pilis nonnullis brevibus adpersa, subtus parce et breve pubescentia, subpenninervia ; receptacula turbinato-globosa, umbonata, pubescentia, aurantiaco-miniata, cerasi magnitudine, pedunculo 3—5 lin. longo crasso pubescente sustentata, vulgo geminatim c foliorum axillis v. supra eorum cicatricibus erumpentia ; bracteæ ad apicem pedunculi, ovatæ, acutæ, glabræ, c. lin. longæ.—*Pegu.*—*F. chrysocarpæ*, Rwdt., affinis, errore quoddam cl. Mi-quel in *Annalis* suis me hanc speciem cum *F. diversifolia* identicam declarasse putavit.

*AMENTACEÆ.*

221. *QUERCUS EUMORPHA*, nov. sp.

Arbor 20—30 pedalis, glaberrima ; folia ovato-oblonga v. oblonga, nonnunquam inæqualia, basi in petiolum gracilem 5—8 lin. longum glabrum attenuata, breve et obtusiuscule acuminata, 3—4 poll. longa, coriacea, apicem versus leviter obtusiuscule serrata, glabra, concoloria, nervis tenuibus et reticulatione densa subobsoletis ; pedunculus fructiger usque ad 2 poll. longus, apparenter glaber, 1 v. 2 fructus gerens ; glans ovoidea, 9—10 lin. fere longa, lævis, exserta ; cupula 7—8 lin. in diametro, concava, crasse coriacea, brunnea, glabra, subverniosa, junior squamis triangularibus acutis adpressis subdistinctis dein in zonas concentricas angustas inæquales et irregulares confluentibus oblecta v. rugato-rugosa.—*Martaban.*

222. *QUERCUS BRANDISIANA*, nov. sp.

Arbor parva v. mediocris, ramulis canescenti, v. ochraceo-pubescentibus ; folia oblonga ad obovato-oblonga, basi sæpius inæquali acuta v. obtusa, 4—5 poll. longa, petiolo 5—8 lin. longo gracili glabro suffulta, breve et obtusiuscule acuminata, obtusiuscule repando-serrata, utrinque subopaca, tenuiter coriacea, supra rugata et glabra, subtus glauca et fugaci-puberula, nervis supra impressis strictis subtus prominentibus sed tenuibus, cum nervatione transversa conspicuis ; pedunculus fructiger c. 1, raro usque  $2\frac{1}{2}$  poll., longus, fructus paucos tantum gerens, ochrascenti-tomentosus ; glandes juniores depresso adpresso puberulæ, magis minusve inclusæ, dein exsertæ, ovoidæ, glabræ ; cupula canescenti-velutina, concava, c.  $\frac{1}{2}$  poll. in diametro, e zonis circ. 5—6 concentricis lamellatis erosis formata.—*Martaban.*—In sect. *Cyclobalani* inserenda.

*CHLORANTHACEÆ.*223. *CHLORANTHUS INSIGNIS*, nov. sp.

Suffrutex  $1\frac{1}{2}$ —2 pedalis, glaber, in sicco sublutescens ; folia petiolis 1—2 lin. longis suffulta, linearia, basi acuminata v. acuta, sensim et longissime acuminata,  $3\frac{1}{2}$ —4 $\frac{1}{2}$  poll. longa, subcoriacea, integra, glabra, nervis lateribus tenuissimis, vix reticulata ; spicæ axillares, fructiferæ 1—2 poll. longæ, simplices, glabræ ; bractee minutæ, crassæ ; fructus casi.—*Martaban.*

*SCITAMINEÆ.**HEMIOCHITIS* nov. sp.

Flores præcoces, spicati, sessiles. Calyx tubulosus, sursum amplius, 3-fidus. Perianthii tubus calyce brevior filiformis ; phylla 3 exteriora æqualia, interiora subæquilongâ, basi utrinque corniculata apice 2—3 denticulata ; labellum lato-oblongum, concavum, apiculatum. Filamentum phyllis fere duplo brevius, apice incurvum, connectivam supra anthera utrinque mutica vix productum. Ovarium 1-loculare, placentis 3 parietalibus ; stylus filiformis ; stigma paullum incrassatum, oblique truncatum. Capsula 1-locularis, subplicato-10-sulcata, 3-valvis ; semina conica, basi albo-arillata.—Herbæ perennes *Gastrochilo* habitu et characteribus essentialibus affines ; scapis radicales pallidi squamati iis *Geodori* haud absimiles.

224. *H. BURMANICA*, nov. sp. Tab. VIII.

Rhizoma album, crassum, repens, hypogæum, nudum ; folia post anthesin erumpentia iis *Gastrochili* simillima, lato-oblonga, brevissime acuminata, basi inæquali-rotundata in petiolum brevem decurrentia, glabra ; vaginæ striatæ, glabræ ; scapi radicales, solitarii, dense tomentelli, a basi usque ad medium bracteis amplis pallidis remotis v. confertis 1—1 $\frac{1}{2}$  poll. longis oblongis et subacutis vestiti ; flores spicati, sessiles, mediocres ; calyx puberulus, albus,

3-fidus, lobis æqualibus acutis; perianthii phylla exteriora 3 fere semipollinaria, virescenti-albida, oblongo-linearia, apiculata v. 2—3 lobulata, marginibus magis minusve recurva, superiori latiore; interiora 2 obovato-oblonga, pallide rubella, apice obsolete 2—3 denticulata; labellum concavum lato oblongum, aurantiacum, basin versus pallidius, intus secum carinam sanguineum carinatum, carina in apiculum 3-angularem acutum excurrente; anthero cerino-luteo, filamenta c. 1 lin. longa, incurva; capsulæ ovales, puberulae, calyce emarcescente coronatæ, c.  $\frac{1}{2}$  poll. longæ; semina basi arillo albo suffulta.—*Pegu, Martaban, Tenasserim.*

### MELANTHIACEÆ.

STEMONA GRIFFITHIANA, nov. sp. Tab. X.

(Gen. nov., Griff. Journ. of Travels p. 149).

Herba erecta, perennis, glabra, rhizomate crasso hypogæo; folia hysteranthia, ovata, c. 3—5 poll. longa, breve acuminata, petiolo 3—5 poll. longo suffulta, chartacea, glabra, parallelinervia, eleganter transverso venosa, sericeanter-nitentia; flores virescenti v. sordide purpurci, pedicellis strictiusculis poll. circiter longis suffulti, in turionibus erectis aphyllis scapiformibus dein foliatis 3—6 poll. longis corymboso-racemosi; bractæ lineari-lanceolatæ acuminatæ, c. 3—4 lin. longæ; perigonium 4-phyllum, phylla poll. longa, v. paullo longiora, lineari-lanceolata, acuta; stamina 4, filamenta lata, purpurea; anthero aureo, cuspidatæ; ovarium 1-loculare, ovulis 6, lineari-oblongis ex apice pendulis capsula compresso-ovata, semipollicares, bivalves, 3—4 spermæ; semina sulcato-carinata, lineari-oblonga, subapiculata, basi arillo brevi albo aucta.—*Ava, Martaban, Pegu.*

### AROIDEÆ.

HAPALINE, *Schott.*

Spatha lanceolata sursum plana, basi tantum complanata et spadice parti femineæ adnata. Spadix interrupte androgynus, genitalibus rudimentariis nullis. Stamina lineari-lanceolata, peltata, membranacea, areolato-reticulata, subtus marginem versus antheras 4—6 minutas globosas gerentia, spadicem linearem a parte feminea paullo discretum obtegentia. Ovaria singula serie superposita, unilocularia, ovulo solitario erecto; stigma subsessile, subcapitatum.—Herbæ humiles, radice tuberosa, uni- v. pauci-foliatæ, spathas niveis.

1. H. BENTHAMIANA, *Schott.* Tab. IX.

Herba c. semipedalis, radice tuberosa, basi albo-vaginata; folia 3—4 poll. longa, petiolo æquilongo suffulta, oblonga, basi profunde sinuato-cordata, lobis basilaribus complicatis et obtusiuscule prolongatis, glabra, breve acuminata, nervis anastomozantibus; flores 1—3-ni e rhizomate pro-

trusi, scapo 5—6 poll. longo gracili suffulti ; spatha nivea, lineari-lanceolata ad lanceolata, c.  $1\frac{1}{2}$  poll. longa, reflexa, reticulata ; spadix spathæ fere longitudinis, ejus pars mascula exserta strictiuscula lineari-subulata, alba.—*Martaban.*

#### TABULARUM EXPLANATTO.

Tab. VIII.—*Hemiorchis Burmanica*.—Fig. A, planta florens, magn. nat. ; fig. B, folium cum cauli vaginato, magn. nat. ; fig. 1, perigonii phyllum exterioris ; fig. 2, phyllum exterius superius ; fig. 3, perigonii phyllum interius laterale ; fig. 4, labellum cum carina, a latere visum ; fig. 5, anthera a latere visa ; fig. 6, eadem a fronte ; fig. 7, capsula, magn. nat. ; fig. 8, semen, arillo remoto.

Tab. IX.—*Hapaline Benthamiana*.—Fig. A, planta, magn. nat. ; fig. 1, spadix ; fig. 2, ovarium ; fig. 3, sectio verticalis fructus, semen immaturum exhibens ; fig. 4, squama staminalis antheras gerens, a latere interiore visa.

Tab. X.—*Stemona Griffithiana*.—Fig. A, planta florens ; fig. B, caulis foliati pars superior ; fig. C, racemus fructiger ; fig. 1, perigonii phylla 2 cum stamine ; fig. 2, semen cum arillo, latere visum ; fig. 3, capsula aperta, semina exhibens ; figuræ omnes magn. nat.

Errores graviores in parte priori (J. A. S. B., vol. XLI, pt. II), corrigendi.

Page 311. lin. 6. infra pro *apicibus* lege *apices*.

Pag. 312. lin. 10. supra pro *pomini* *majoris magnitudine* lege *pomi minoris magnitudine, brunneo-velutinæ*.





NOTES ON SOME SPECIES OF MALAYAN AMPHIBIA AND REPTILIA,—  
by DR. F. STOLICZKA.

(Received 15th Feb. 1872; read 5th March, 1872.)

[With plate XI.]

It is nearly three years ago that I had the pleasure of submitting to the Society a few notes on Indo-Malayan Reptiles and Amphibians, chiefly collected by myself along the Burmese and Tenasserim coasts, about Penang and on the Nicobar and Andaman islands. When visiting Penang in 1869, I received information of a tolerably extensive\* collection of Reptiles, brought together by a zealous Jesuit during a residence of about twenty years on the island. The specimens were collected either on Penang itself or on the opposite coast of the Wellesley Province. A very large number had been captured alive, and coloured drawings, taken from most of the live specimens, had been prepared. The colouring appeared to me to have been faithfully copied, and this it was which particularly excited my interest in the collection, because in many cases the colours of Reptiles fade most rapidly, as soon as the specimens are placed in spirit; in others the colouring changes immediately after death, and again some alter even during life their colour, as soon as they become conscious of their captivity. In any case the coloured sketches from life seemed to me valuable and I, therefore, resolved to buy the collection.

As soon as the formal matters were arranged, the collection of the specimens was transmitted to me, the drawings, however, were afterwards not considered to form an essential part of it, and were handed over to some one else, according to a wish of the deceased gentleman under whose supervision they were executed. After a brief correspondence it did not appear to me much use treating further about the subject. My interest in the collection has, on that account naturally enough, partly diminished, and having had other more pressing work to attend to, the specimens were for more than two years left unnoticed. More recently my friend Mr. Stahlknecht of Singapore visited Sumatra, and made for me a very nice little collection of Reptiles, most of which were in a beautiful state of preservation. This circumstance induced me to look over my old acquaintances, and to prepare a critical list of all of them. In the old collection I only found two new species, a *Rana* and a *Simotes*, a specimen of the latter had very recently been also obtained by Mr. J. Wood-Mason's collector at Jahore, situated at the extreme south end of the Malayan Peninsula, north of Singapore island. Mr. Stahlknecht's collection yielded a new *Calamaria*.

\* This refers to the number of specimens, but not to that of species, as I subsequently discovered.

Thus, although I cannot say, that I came into possession of a great number of new forms, there are among those, which I shall place on record, a few rare and very interesting species, some of which were previously known only from single specimens, and those often were not very perfect. I may mention for instance *Draco quinquefasciatus*, *Podophis chalcides*, *Ophites subcinctus* and *albofuscus*, *Ablabes flaviceps*, *Oxycalamus longiceps*, &c.

I shall first enumerate all the species, and attach an (\*) asterisk to those, about which I shall have to say a few words.

The collection was made, as I said, to a large extent on Penang itself or in the Wellesley Province, and judging from the examination of it, I have found no reason to doubt in any way this statement. A great many of the same species had been collected by myself in that part of the country on a former occasion, others were known to occur there from the very elaborate and extensive researches of Dr. Cantor; others again had been recorded from Malacca, Singapore, Sumatra or Java, all countries which belong to the same zoological province, and which have a large number of species common. I have not met with a single instance which would lead me to suspect, that any mixture of other distant localities had taken place. Thus the present list in connection with that of Drs. Cantor, Gray and Günther, and my own published in 1870, may be considered as fairly completing the number of Reptiles and Amphibians, inhabiting Penang and the neighbouring Wellesley Province. Mr. Stahlknecht's specimens are from the neighbourhood of Dilli on Sumatra. In the general list I shall briefly note the localities as *Penang* and *Sumatra*.

#### BATRACHIA.†

1. *Rana tigrina*, var. *pantherina*, Fitz. apud Steindachner. (Novara Amphibiens).—*Penang*.

2.\* „ *fusca*, Blyth.—*Penang*.

3. „ *lymnoccharis*, Boie (= *gracilis*, Wiegman.); typical.—*Penang*.

4.\* „ *lymnoccharis*, var. *pulla*, Stol.—*Penang*.

5.\* „ *plicatella*, n. sp.—*Penang*.

6. *Polypedates maculatus*.—*Penang*.

7. „ *quadrilineatus*.—*Penang* and *Sumatra*.

8. *Hylarana erythraea*.—*Penang* and *Sumatra*.

Comp. Proceed. A. S. B. for June, 1872, p. 104. The largest specimen measures: body 3 inch, hind limb 5 inch.

9. *Bufo melanostictus*.—*Penang*.

† If no special reference to literature is given, it is understood that the species is described in Dr. Günther's Reptiles of Brit. India, or in my former paper on Malayan Reptiles in Journal A. S. B. vol. xxxix, pt. II.

10. *Bufo asper*.—*Penang*.  
Largest specimen, body 5·5 inch. long.
11. *Epicrion glutinosum*.—*Penang*.

## SAURIA.

12. *Euprepes carinatus*, Schneid., = *rufescens*.—*Penang* and *Sumatra*.  
All have a rufescent bronzy tinge and dorso-lateral pale bands.
- 13.\* *E. olivaceus*.—*Penang* and *Sumatra*.
14. *Riopa albopunctata*.—*Penang*.  
Exactly the same as in Bengal.
15. *Podophis chalcides*.—*Sumatra*.
- 16.\* *Gymnodactylus* (? *Cyrtodactylus*) *pulchellus*.—*Penang*.
17. *Cyrtodactylus affinis*.—*Penang*.  
Comp. J. A. S. B. vol. xxxix, pt. II, 1870, p. 167.
18. *Peripia mutilata*, Wiegman, = *Peronii*, D. and B., testis Peters et Günther. — *Penang* and *Sumatra*.
19. *Hemidactylus frenatus*.—*Sumatra*.
20. *Nycteridium platyurus*, Schneid. = *Schneideri*.—*Penang* and *Sumatra*, very common.  
All have less dark coloration than Himalayan or Khasi hill specimens, but are in other respects not distinguishable, Comp. J. A. S. B. xl, pt. II, p. 103.
21. *Gecko guttatus*.—*Penang*.
22. „ *stentor*.—*Penang*.
23. *Ptychozoon homalocephalum*.—*Penang* and *Sumatra*.
24. *Bronchocela cristatella*, Kuhl. — *Sumatra*, very common.  
All have 36 to 42 small equal scales in a lateral row.
25. *Draco volans*, Linn. — *Penang* and *Sumatra*, very common.
- 26.\* „ *quinquefasciatus*.—*Penang*.
- 27.\* „ *fimbriatus*.—*Penang*.
28. *Hydrosaurus salvator*.—*Penang* and *Sumatra*.

The light spots and bands are in young and in old males [at least] bright yellow, not white. The species is also very common on all the Nicobar and Andaman islands.

29. *Crocodilus porosus*.†—*Penang*.

† The similarity of form and colour of the young of this species with equally large specimens of *C. Pondichermanus*, Günther, is very striking. My collector recently brought several young specimens (12-14 inches) of the latter species from Arrakan, and when compared with equally large specimens of *porosus*, the former all have the snout, and also the tail, conspicuously shorter; all have only six rows of shields on the back, but there is an additional one on either external edge broken up into single shields. In *porosus* the outer row of shields on either side is complete, or continuous, and on the whole the dorsal shields appear to be smaller. In every other respect the young of both species are identical. I have not seen an adult of *Pondichermanus*, but it ought to be looked for in Arrakan. Both have a small shield on either anterior side of the

## OPIIDIA.

30. *Typhlops nigroalbus*.—Penang.
31.     "     *braminus*.—Penang.
32. *Cylindrophis rufus*.—Penang.
- 33.\* *Calamaria Stahlknechti*, n. sp.—Sumatra.
- 34.\* *Oxycalamus longiceps*.—Penang.
- 35.\* *Simotes bicatenatus*.—Sumatra and Penang.
- 36.\*     "     *cruentatus*, Theob.—Penang.
- 37.\*     "     *catenifer*, n. sp.—Penang and Jahore.
- 38.\* *Cyclophis tricolor*.—Sumatra.
- 39.\* *Ablabes flaviceps*, Günth.—Sumatra.
40. *Compsosoma (Elaphis) melanurum*.—Penang.
41.     "     *radiatum*.—Penang.
42. *Ptyas korros*.—Penang.
43.     "     *hexagonotus*, (Cant.).—Penang.
44. *Tropidonotus quincunctiatus*.—Penang.
45.     "     *trianguligerus*, Schleg.—Penang.
46.     "     *vittatus*.—Penang. (Günther's Colub. Snakes).
- 47.\* *Gonyosoma oxycephalum*.—Penang.
- 48.\* *Dendrophis caudolineatus*, Gray.—Penang and Sumatra.
49.     "     *pictus*.—Penang and Sumatra.
50. *Tragops prasinus*.—Penang and Sumatra.
51. *Dipsas cynodon*.—Penang.
52.     "     *Drapiezii*.—Snmatra. (Comp. Schlegel's Abbildungen).
53.     "     *dendrophila*.—Penang.
54. *Chrysopelea ornata*.—Penang and Sumatra.
55.     "     *rubescens*.—Penang and Sumatra.

neck, it being a rudiment, or rather probably the beginning, of the anterior nuchal plates.

Besides *C. Pondicherianus*, my collector brought among others the following species which I do not think had been previously recorded from Arrakan.

*Callula pulchra*.

*Diploelma carnaticum* and *D. Berdmorei*.

*Polypedates maculatus* and *P. quadrilineatus*.

*Hylarana erythraea* and *H. Tytleri*. Both quite distinct species.

*Riopa lineolata*.

*Tachydromus seolineatus*.

*Hemidactylus (Doryura) Berdmorei*.

*Hinulia maculata*. Also common on all the Andaman and Nicobar islands.

*Lycodon aulicus*, (black variety).

56. *Psammodynastes pulverulentus*.—Penang.  
 57. " *pictus*.—Sumatra.  
 (Colub. Snakes, p. 251). Exactly agreeing with Günther's description.  
 58. *Lycodon aulicus*.—Penang.  
 59.\* *Ophites subcinctus*.—Sumatra.  
 60.\* " *albofuscus*.—Sumatra.  
 61. *Bungarus fasciatus*.—Penang.  
 62. *Adenophis*\* (*Callophis*) *intestinalis*.—Penang.  
 " " *bivirgatus*.—Penang and Sumatra.  
 63. *Xenopeltis unicolor*.—Sumatra.  
 64. *Python reticulatus*.—Penang.  
 65. *Hypsirhina enhydis*.—Penang.

All specimens have an almost continuous dark line along the middle of the lower side.

66. *Hypsirhina plumbea*. (Very variable).—Penang.  
 67.\* " [*Ferania*] *alternans*.—Sumatra.  
 68. *Fordonia unicolor*.—Sumatra.  
 (The young are brownish olive with numerous dark dots).  
 69. *Cerberus rhynchops*.—Penang.  
 70. *Homalopsis bucata*.—Penang.  
 71. *Hipistes hydrinus*.—Penang.  
 72. *Hydrophis robustus*.—Sumatra.  
 73.\* *Trimeresurus Wagleri*.—Penang and Sumatra.  
 74. " *erythrurus*.—Penang.

#### RANA FUSCA.

Comp. Anderson in P. Z. S. for 1871, p. 197.

Rufous brown above, with a pale longitudinal dorsal streak, broad in front, narrow towards the posterior end; limbs above somewhat indistinctly variegated and banded with darker brown, posterior side of femora with closer and darker variegations. Lower side uniform whitish, except a few dark spots on the lower lip, but the front-end of the lower lip has a conspicuous white spot, as stated by Blyth.

The nostrils are much nearer the snout than the eye; the tympanum is smaller than the eye, but quite distinct in a nearly full grown specimen; skin above and at the sides of the belly with few scattered slightly enlarged tubercles; lower side perfectly smooth. The first and second fingers are slightly shorter than the third and fourth respectively; the second is shortest. The metatarsus has a single, inner, marginal, elongated tubercle. The first and fifth toes are fringed externally, but the tarsus has no fold. The toes are entirely webbed and their tips very distinctly swollen.

The length of the body equals the distance from the vent to half the length of the tarsus.

\* See Peters in Monatsb. Berlin Akad., 1871, p. 579.

*RANA LYMNOCHARIS, var. PULLA.*

Comp. Stoliczka, Journ. A. S. B. vol. xxxix. pt II, 1870, p. 144.

Since the publication of my notes on this variety I have received two other specimens from Penang. The form of the body, the teeth, the structure and general coloration exactly agree with typical *lymnocharis*, except that in one of the specimens the four dark bands on the upper side of the femora are well marked and somewhat narrower than in the other, in which the coloration is typical. In both, the lower lip is spotted and the chin variegated with dusky. Neither of the specimens has a dorsal pale streak.

One of them measures, body 1·35 inch., which is only one tenth less than the distance between the vent and the metatarsal tubercle, the total of the hind-limb being 2 inch., while in a specimen of typical (half-webbed) *lymnocharis* of which the body is also only 1·35 inch., the distance between vent and metatarsal tubercle is 1·15 inch, but the total hind-limb is 2·2 inch. Thus in *lymnocharis var. pulla* the metatarsal bones are longer and the fourth toe on the contrary much shorter than in typical *lymnocharis*. In the former also, as previously noticed, the toes are nearly fully webbed, the web reaching to very near the tip of the third and fifth toes, but only to the base of the penultimate joint of the fourth toe.

The other specimen has the length of the body 1·3 inches, which is equal to the distance between the vent and the heel, and the total hind-limb is 2·17; thus very nearly equal to that of *lymnocharis*, only differing from it by the fuller webbing, the web reaching fully to the middle of the penultimate joint of the fourth toe. In this specimen also the tips of the toes are all remarkably swollen. All other characters are exactly as in typical *lymnocharis*.

These variations appear to me to indicate that they are progressive or undergoing certain changes according to the requirements of the animal, and that we are, therefore, not entitled to give them a specific value, unless they become permanent. I look upon this longer-limbed, shorter-toed and fuller-webbed hill form of *lymnocharis* as a small (*pulla*) local variety, possessing certain peculiarities, in exactly the same manner as the Andaman and Nicobar variety of the same species. (Comp. l. c. p. 142 et seq., and Proc. A. S. B. for June 1872, p. 102).

*RANA PLICATELLA, n. sp. Pl. XI. Fig. 1.*

Body moderately stout with longish hind-limbs and swollen tips to the toes.

Head large, snout obtuse, with the canthi rostrales rounded; nostrils lateral, oval, somewhat directed upwards, nearer to the tip of the snout than to the eye; eye large, prominent, its longer diameter is slightly more than

the distance between it and the nostril, but it is equal to the width of the upper side between the eyes. Tympanum naked, as large as the eye.

Head smooth above, hinder half of the eyelids tuberculated<sup>4</sup>; body above with about eight longitudinal somewhat interrupted folds, with numerous small tubercles between them; limbs also smooth above, with the exception of the posterior halves of the tibiae, which are tubercular; chin in front with a few scattered, minute tubercles, a few others exist on the side of the belly, and the hinder part of the sacral region is densely studded with small plicated tubercles; the remainder of the under side is smooth.

The length of the body is very nearly equal to the distance between the vent and the middle of the tarsus; the fore limb is equal to the distance from the tympanum to the groin. The first finger is scarcely shorter than the third, the second and fourth are subequal. There is a slight fold on the inner lower edge of the tarsus, and one along the outer edge of the fifth toe. The tarsus has a single, inner, elongated, marginal tubercle. The toes are about three-quarter webbed, the web reaching on the fourth toe to scarcely beyond the base of the third-ultimate joint; on all the other toes it extends to the last joint, but it is deeply emarginate between all of them. The tips of all the toes are much swollen, the length of the fourth measured from the base of the tarsus is slightly less than half the length of the body.

Lower jaw with two fang-like projections directed inward. Tongue elongate, much broader towards the tip than at the base, terminating with two moderately sized projections. Vomerine teeth in two short oblique converging series. Sacral diapophyses not dilated.

Above, greenish brown, with a dark band from the nostril through the eye, continuing behind it; limbs with numerous transverse dark bands; they are somewhat ill-defined on the upper arm, on the lower arm there are three or four very short ones, six on the femur, five somewhat more distant ones on each tibia, three on the tarsus, one on metatarsus and a few more on the outer-side of the toes. The hinder sides of the femora are densely and rather minutely variegated with dark brown; a horse-shoe shaped yellow mark, open below, round the anus; folds on the tarsus and outer toe also yellowish; lips indistinctly variegated with pale and dusky; lower side uniform white, except on the tibiae, and on the feet, which are speckled with dark.

The only species which in some respects resembles the present form is *Rana porosissima*, Steindachner, from Angola (Novara Amphibiens, p. 18, pl. I, figs. 9-13), but it differs in the coloration of the limbs, in the smaller size of the tympanum, smaller vomerine ridges of teeth, in having the apophyses on the lower jaw scarcely enlarged, the tips of the toes not swollen &c.

**EUPREPES OLIVACEUS.**

The young (body 1 to 1.5 and tail 1.5 to 2 inches) are very differently coloured from the old. The snout and headshields are olivaceous, the posterior edges of all the shields being blackish; the whole body and limbs are blackish brown, with numerous rather close, transverse, greenish white or yellow stripes; tail and the entire lower side yellowish white, or quite yellow. In the adolescent and some old ones the pale transverse bands exist as remnants in the shape of transverse series of spots, but most adults become entirely olivaceous, with only the edges of the eyelids bright yellow.

**GYMNODACTYLUS PULCHELLUS.**

In the descriptions of this species it is usually stated that there are six dark, white edged bands across the body, but properly speaking the sixth band is situated on the base of the tail. Further, it is stated that a fold of the skin exists along the side of the body. This is in reality not the case, at least not in live specimens, but the shield-like scales of the lower side are separated from the granular upper surface by a row of conspicuously enlarged granular scales; this row becomes strongly prominent in spirit specimens, and gives the appearance of a fold.

As regards the position of the femoral pores the species is intermediate between *Cyrtodactylus* and *Gymnodactylus*, the pores lying first in a longitudinal fold and then extending flatly on the femora. This instance shews that *Cyrtodactylus*, (as likewise the present species), should be looked upon merely as a section of *Gymnodactylus*.

**DRACO QUINQUEFASCIATUS.**

A single male specimen measures: head and body 3.5 inch, tail imperfect, apparently about 5 inches. The hind limb is contained 1.33 times in the distance between it and the fore limb, the latter being somewhat shorter than the former. There are no enlarged tubercles on the head, but only a number of interspersed, slightly larger white scales at the sides of the neck, and a broad band of closer set ones across the occiput. The scales on the anterior part of the back are obsoletely keeled, on the posterior part they are perfectly smooth. On the wings scales are present along all the ribs, and in numerous longitudinal series on the basal half of the alar skin, while further on their number greatly diminishes, except again at the outer margin.

The specimen has only a very slight indication of a crest on the neck; the gular sack is very long and lanceolate, a dark band running at its posterior base across the lower neck. Chin dark spotted, like the body; tail also spotted at its base, but further on with brown bands. In all other respects the specimen agrees with Gray's characteristic description.



## DRACO FIMBRIATUS.

Dumeril and Bibron, vol. iv, p. 448.—Gray, *Lizards*, p. 234.

A specimen from Penang exactly agrees with the one figured by Gray and Hardwicke in *Illust. of Indian Zoology* as *D. abbreviatus* from Singapore. The scales of the back are very small and almost quite smooth, with a series of larger ones on either side at the base of each wing. Günther (*Rept. Brit. India*, p. 123) says that no orbital or rather post-orbital, spine exists. This is a mistake, at least as far as male specimens are concerned. In these there are two very distinct post-orbital spines; they are well shewn in Gray and Hardwicke's figure. Dumeril and Bibron's minute description of the headshields from Javanese specimens also appears exactly to correspond with the structure of Singapore and Penang specimens.

General colour bronze brown; head, not including the nape, a zigzag undulating slightly variegated band across the neck, another across the shoulders, a third between the hind limbs, and a fourth, though less distinct one, across the middle of the body, pale bluish, a bluish black spot between the eyes; on the body are four irregular marks, each composed of a few blackish lines, and each enclosing along the middle of the back a somewhat elongated diamond-shaped figure.

Limbs with cross dark stripes, and bluish edges to all the front and hind sides. Wings above blackish with radiating bluish lines, below pale with a few scattered black spots. Tail banded with bronze and pale bluish. Chin variegated with dark; gular pouch tinged with blue and red, dusky at the base. Body below uniform yellowish white, with scattered bluish dusky spots, mostly conspicuous along the sides.

## CALAMARIA STAHLKNECHTI, n. sp. Pl. XI. Fig. 2.

Body long, cylindrical, snout somewhat narrowly obtuse; total length 13·5 inches, of which the tail is 1·2 inch; rostral reaching to the upper surface of the head; frontals anteriorly narrower than posteriorly, laterally bent down, and in contact with first and second labials, the nasal being very small; occipital six-sided, with the anterior angle shorter and more obtuse than the posterior one, it is smaller than one occipital; each of the latter has an obtuse angle in front and behind, and both form an inwardly directed angle along the suture on either end; one præ- and one post-ocular; five upper labials, the third and fourth touch the orbit, the fifth is largest, in contact with the post-ocular and occipital; it is followed by a moderately sized shield which has quite the appearance of a sixth labial, and indeed the gape partially extends below this quasi-sixth labial; above this last extends a long temporal. Mental shield small; five lower labials; the first pair is the smallest, separated from each other, the fifth the largest. The first pair of chin-shields is largest, each being in contact with three labials and having a very

obtuse angle behind ; the shields of the second pair are only about half the size of the first, entirely separated from each other by two scale-like shields following each other, and by two other somewhat larger shields from the first very large ventral. Scales smooth, in thirteen rows ; ventrals 163, anal entire, subcaudals 22, the last single occupying the shortly pointed end of the tail.

Uniform iridescent brownish black above, the two outer series of scales on either side mostly white ; upper labials spotted with yellow, the fifth labial being almost entirely yellow. Lower side, beginning a short distance from the throat, with two or sometimes three ventral shields alternately yellowish white and black, the black colour encroaching laterally upwards upon the yellowish white lateral bands, and being longitudinally connected along the edges of the ventrals and subcaudals ; the latter have besides an interrupted blackish line along the middle, and the pale colour is tinged with vermilion. Possibly the red colour extended over the whole of the light coloration during the life of the snake.

The only specimen examined was sent to me with several other species by my friend Mr. Stahlknecht of Singapore ; he collected the same near Dilli on Sumatra.

In general aspect the species resembles *O. Linnæi*, but differs essentially in several points of its structure. It also does not agree with any of the species more recently described by Bleeker and Edeling, or figured by Ján.

#### OXYCALAMUS LONGICEPS.

A single specimen of this rare snake was in the Penang collection ; it measures seven inches of which the tail is one.

The following may be added to Cantor's and Günther's descriptions :

The rostral shield is of moderate size, reaching with its angle to the upper surface of the head ; anterior frontals small, each about one-third the size of a posterior ; the suture separating the two anterior frontals is only two-fifths of the length of the suture between the posterior frontals ; vertical six sided, the sides touching the supraciliaries being parallel to each other ; one supraciliary not quite as wide as half the width of the vertical ; occipitals nearly double the length of the vertical, reaching down on either side to the postocular ; nasal in a *single* shield.

Vent. 137, anal entire, subcaudals 29.

Uniform iridescent black above and below, many of the ventrals and subcaudals with paler posterior edges ; a pale yellowish spot on the fifth upper labial and a second one on each side of the throat.

#### SIMOTES BICATENATUS.

In several specimens, the dark dorsal band is divided by a pale reddish

line. A young specimen has only one præocular, and only the upper smaller temporal is in contact with the postoculars.

SIMOTES CRUENTATUS.

Comp. Proceed A. S. B. for August, 1872, p. 145.

This species agrees in general aspect and coloration with *S. bicatenatus*, but it has only seventeen rows of scales. One specimen in the collection has a small portion of a labial detached, forming a second (lower) præocular; it has very few dark blotches on the anterior ventrals; only two black spots on the tail, one at the root, the other near the tip.

SIMOTES CATENIFER, n. sp. Pl. XI. Fig. 3.

The body is short, stout, moderately compressed, the head large, conspicuously truncate in front.

Rostral shield well reaching to the upper surface of the head; anterior frontals considerably smaller than the posterior ones, both bent down at the sides; superciliaries narrower anteriorly than posteriorly; vertical large, six-sided, with a very obtuse angle in front, somewhat converging sides, and with nearly a right angle behind; one occipital is about the same size as the vertical, each reaches down to the superior postocular and is rather broadly truncate behind. Nostril between an anterior large and a posterior somewhat smaller shield; loreal squarish; two præ-oculars, the upper is long, while the lower has the appearance of being only a small detached portion of the fourth labial; two postoculars; temporals 1 + 2 + pl., the last is somewhat irregular and scale-like, the first obliquely in contact with both postoculars. Eight, rarely nine, upper labials, the fourth and fifth under the orbit, sometimes a small portion of the fourth is detached, touching the orbit as a separate shield. Mental shield small; nine lower labials, those of the first pair form a suture; anterior pair of chin-shields largest, each in contact with four labials; second pair much smaller, and separated by other two somewhat smaller pairs following each other from the first ventral. Scales smooth, in nineteen rows; ventrals 178 to 205, distinctly angular at the sides; anal entire, moderately enlarged; subcaudals bifid, in 57 pairs.

The general coloration of the upper side is sandy brownish; head with the usual dark brown markings; the first band crosses the eyes and reaches forward to the rostral; the second ascends across the angles of the mouth to the outer median edge of the occipitals; the third is thick, arrow-shaped, anteriorly prolonged to between the eyes. Body with twelve or thirteen dark cross bands, each composed of four confluent spots, the two dorsal ones being larger and darker; tail with four or five cross bands. Between each two of these bands the scales, following alternately each other, are partially blackish, forming three undulating cross lines in each interspace. The sides

along the ventrals are checkered with blackish brown; lower labials with their hinder edges blackish. Lower side dusky yellowish, tinged with red which passes into vermilion on the posterior half; every second or third ventral has a quadrangular black spot at each of the outer edges, the interposed edges being white, and the spots are somewhat more distant on the ventrals than on the caudals.

The total length (in two specimens) is 9.5 inch., the tail being 1.75. I have received one specimen from Penang and Mr. Wood-Mason lately obtained a second one from Jahore, North of Singapore.

This is the fourth species of a small group of *Simotes*, all of which are closely allied to each other and all belong to the Malay or Chinese fauna: they agree in their small size, short and stout body, in the form of the head-shields and in coloration. *S. Cochinchinensis*, Günther, has twenty-one rows of scales round the body. *S. brevicauda*, Steindachner, (Novara Rept. p. 61, pl. iii, figs. 13—14) has, like *catenifer*, nineteen rows of scales, but the occipitals and oculars are in the former somewhat differently shaped, the markings on the head are also somewhat different, and there are no lateral spots on the ventrals; in every other respect both species almost perfectly agree, as far as I can judge from the figure and description, and if I had not obtained two perfectly like specimens of *catenifer* from different localities, I would have hardly ventured to separate them as distinct. The fourth species is Ján's *S. ancoralis*, which has the black spots on the edges of the ventrals, but only seventeen rows of scales round the body and only one præ-ocular.

#### CYCLOPHIS TRICOLOR.

Schlegel, *Phys. Serp.* II, p. 187, pl. vii, figs. 16—18; *idem*, Dum. and Bibr.; Günther; Ján, *Oph. Livr.* 31, pl. vi, fig. 2.

One specimen measures 18.5 inches, of which the tail is 7<sup>1</sup>/<sub>2</sub> inch. Scales smooth, in fifteen rows, vent. 144, anal bifid, subcaudals 129. Greyish, or rather olivaceous, brown above, yellowish white below, a black streak from the nasal through the eye to the side of the neck, rapidly disappearing on the anterior part of the body. Each six-sided scale, above, has the anterior lateral margins pale, producing longitudinal zigzag pale lines; upper labials yellow; along the edges of the ventrals and sub-caudals runs an indistinct dusky line, and another interrupted one along the middle of the ventrals, these lines begin to appear a short distance from the neck, which is below and at the sides uniform yellowish.

The fine zigzag pale lines of the upper side are indicated in Ján's figure. Both in structure and coloration the Sumatra specimen agrees with Schlegel's figure and description, except that the head is a little more slender. This specimen had a large spider in the stomach. Schlegel's snake was

from Java and the species has, I think, not yet been recorded from anywhere else.

*ABLATES FLAVICEPS*, (*var.*), Günther.

Ann. and Mag. Nat. Hist. vol XVIII, 1866, p. 26, pl. vi, fig. B.

One specimen agrees well with Günther's description and figure of this snake, but it has nine upper labials, the second being replaced by two, so that the 1<sup>st</sup>, 5<sup>th</sup> and 6<sup>th</sup> labials enter the orbit. The hinder chin-shields are almost in immediate contact with the first well marked ventral. Total length 16·7 inch., of which the tail is 5·5 inch., being somewhat obtuse at the end; scales in 17 rows, one præ- and one or two post-oculars, 150 ventrals, anal bifid, 70 subcaudals.

Head yellow, somewhat tinged with brown in front, a straight black streak through the eye and a white one along the upper labials. The general colour of the upper side is brown, powdered with grey; a light blue band begins on each side of the neck, continuing on each side of the back, the colour gradually turning to grey, but both bands remain tolerably distinct to the tip of the tail. On the front part of the body each is marked with squarish black spots along the inner edge, further on the spots become smaller, alternate in position on the two sides, but are somewhat removed from the internal margins towards the middle line. Below, yellowish, all the ventrals, (except those on the neck), with narrow blackish hind edges about the middle of the body, almost meeting in the centre, but further on the black becomes more confined to the outer margins, and on the subcaudals it forms a serrated black band on either side, as in *Ablates melanocephalus*, to which the present species bears a very strong resemblance. Dr. Günther mentions in his specimen only the presence of a black spot on either side of the ventrals.

*GONYOSOMA OXYCEPHALUM*.

A very large specimen, measuring about five feet, has the scales round the body in 27 series; it is sea-green, the tail strongly tinged with rufescent brown, the sutures of the scales being blackish; the dark streak on the side of the head is very indistinct; upper labials whitish green.

*DENDROPHIS CAUDOLINEATUS*.

Dr. Günther when noticing my paper on Ponang Reptiles in the Zool. Record for 1870, says that I described his *D. caudolineolatus* (from Ceylon), as *D. caudolineatus* of Gray. I should have hardly expected such a brief dismissal of the consideration of all other points connected with the identification of this species. Dr. Günther appears to have noticed merely my statement regarding the thirteen rows of scales round the body, and to this one charac-

ter he seems to have sacrificed everything else. Now the Penang species, of which I lately also received four beautifully preserved specimens from Sumatra, has only *thirteen rows of scales*. Cantor's description of the snake is admirable, and he gives also thirteen rows of scales. Dumeril and Bibron, when describing their *D. octolineatus*, also speak of only thirteen rows, and Ján (Ophid. Livr. 31, pl. II,) gives the same number of scales when figuring the species under Dum. and Bibron's name.

Thus the question to be determined is, whether Gray's type has thirteen or fifteen rows of scales round the body? If fifteen rows are present, we have to see whether we are entitled to regard this number as a normal or abnormal one in that particular specimen, that is, whether other specimens from the same locality have 13 or 15 rows of scales; for as far as other points of structure and coloration go, the Penang and Sumatra species is absolutely identical with Gray's *caudolineatus*. I have no Bornean specimens for comparison, so I can add nothing more towards the solution of the question.

The Ceylonese *D. caudolineolatus*, as far I can judge from the description and figure of it, differs in the structure of the præ-ocular, in the upper labials, and so very essentially in coloration, that I could not have thought of identifying the Penang *caudolineatus* with it.

#### OPHITES SUBCINCTUS.

One specimen measures eighteen inches, of which the tail is 3.25 inch. The general colour of the upper surface is black, slightly duller at the sides, dull olivaceous blackish below; front head above blackish brown; seventeen broad white rings round the body, the first on the neck, and four on the tail; the white of the rings is considerably more distinct on the anterior than on the posterior part of the body. The eight median rows of scales on the back are keeled; eight upper labials, regular on both sides.

#### OPHITES ALBOFUSCUS.

A remarkably slender snake, measuring 18.75 inches, of which the tail is 5.75 inch. It has seventeen rows of scales, all strongly keeled, the keels on the back being finely crenulated. The general structure exactly agrees with Günther's account of the species. The specimen has 241 ventrals, anal bifid, and 178 subcaudals, the last shield is single, very long and cylindrical.

The general colour is dark brown above, olivaceous white below; hind head and collar on neck very slightly olivaceous white tinged with yellow; body with twenty-six transverse white cross bands, some are imperfect, the intermediate brown bands of ground colour being first thrice, afterwards only twice as broad as the white ones. Tail with about twenty-six transverse white bands, several of them succeeding each other being often

confluent along the middle line, and all are about equally broad as the brown bands separating them; towards the tip of the tail the light coloration prevails and almost entirely suppresses the dark one.

Mr. Stahlknecht obtained only a single specimen near Dilli on Sumatra. Dumeril and Bibron also described a specimen from Sumatra; another one is reported by Dr. Günther as having been brought from Malabar, but as it was bought from a dealer, the locality is not considered reliable.

#### HIPSIRHINA [FERANIA] ALTERNANS, REUSS.

*Eurostus alternans*, apud Dum. and Bib., *Herp. Gen.*, VII, p. 957.

*Homolopsis decussata*, Schlegel.—*Hipsirhina alternans* apud Ján, *Ophid.*, Livr. 30 pl. vi, figs. 1 and 2.

One specimen measures: total length 8.25 inches, the tail being one inch. It has two anterior frontals, the first scarcely half as large as the posterior, vertical six-sided, much smaller than one occipital; one loreal, one præ-ocular, two post-oculars; seven upper labials, the fourth under the orbit; the two first lower labials are in contact; two pairs of chin-shields, the first forms a suture, the shields of the second pair are much smaller, diverging and with their upper pointed ends lying between the first chin-shields and the labials. There are twenty-six rows of scales immediately behind the head, twenty-two round the neck, below interrupted by the second ventral, and nineteen round the middle of the body, ventrals 157, anal bifid, subcaudals thirty-four, the first five entire, the last conical.

General colour brown; head, above, anteriorly with a few pale spots; back with narrow pale (yellowish) cross bands: the first passes over the hind-edges of the occipitals and is laterally bipartite, the next four are simple and complete, the following after these mostly interrupted along the centre, and after the middle of the body the bands become reduced to indistinct lateral spots. The sides of the body are marked with a series of pale yellow cross-bars, more than one scale broad, and are separated by equally broad bands of the general brown coloration; the lateral pale bands more or less encroach upon the ventrals, but the general colour of these latter is pale brown. Chin and upper labials spotted with yellow.

This coloration slightly differs in minor details from that given by Ján, but it agrees with it in all essential points.

The larger size of the occipitals as compared with the vertical, the smaller number of upper labials and of the scales round the middle of the body, and the coloration readily distinguish the present species from *F. Sieboldi*.\*

\* Günther, in *Ann. and Mag. N. H.*, 1866, xviii, p. 28 and in *Zool. Rec.* for 1868 says, that Ján figured *F. Sieboldi* as *Hypsirhina Bocourti* (*Iconograph. Livr.* 28, pl. v, fig. 2). Ján's *H. Bocourti* has apparently only 23 or 25 rows of scales round the body,

## TRIMERESURUS WAGLERI.

Fresh specimens are black above, with numerous spots on top of head, the superciliary edges, both lips, numerous narrow cross bands and the whole of the lower side bright golden yellow with a greenish reflection during life; the stripe from the nostril to below the eye, continuing above the angle of the mouth, one stripe on each side along the margins of the labials, and all the other light spots on the back, but particularly at the sides, are sea-green, more or less tinged with yellow.

NOTES ON THE INDIAN SPECIES OF THELYPHONUS,  
by DR. F. STOLICZKA.

(Received 23rd February, 1873, read 5th March, 1873.)

[With plate XII.]

Towards the end of last year, a monograph of the genus *Thelyphonus* appeared in the September number of the Annals and Magazine of Natural History. The author of the paper, Mr. A. G. Butler, seems to have sifted well the materials of the national collection in the British Museum, but whether he has succeeded in his determinations of known, described and figured, species, is a question on which I may be permitted to say a few words. I will not unnecessarily transgress the field of my observations, and will chiefly confine my remarks to the Indian representatives of the genus.

I had for some little time devoted attention to these Arachnoids, and it has been my intention to publish a detailed monograph of the Indian *Thelyphoni*, together with an account of their anatomy,\* notes on their habits, propagation, development, etc., all points about which our present knowledge is as yet very imperfect. Unfortunately, I have just at the present neither the time nor the materials which would justify me to treat satisfactorily with this subject, and I must leave it, therefore, for a subsequent communication. One of the chief objects of the accompanying notes is to draw the attention to certain discrepancies, or perhaps insufficiencies, in Mr. Butler's determinations of a few of the Indian *Thelyphoni*.

the coloration is somewhat similar to that of *F. alternans*, the occipitals are much longer than the vertical, and there is only one anterior frontal, this, however, is also said to exist in an old specimen of *Sieboldi* from Siam. Still I am not certain that Günther's suggested identity of the two snakes will be confirmed.

Ján does not acknowledge the distinctness of *Ferania* from *Hipsirhina*, and if *F. Sieboldi* has occasionally only one anterior frontal, the principal reason for keeping the two genera as distinct no doubt loses its validity.

\* As compared with that of the Scorpions.



Lucas' account of the external anatomy of *Thelyphonus* is the only reliable one which we as yet possess. Short as it is, it clearly points out the great relation of the genus to *Phrynus*, and its essential difference from the scorpions.

As regards general distribution, I may say, that on the whole, particularly when compared with scorpions, the *Thelyphoni* are rare. I have only observed two life species, *T. scabrinus* and *T. (conf.) angustus*. Both were found at the foot of the Sikkim hills in damp places under the bark of old trees. They are crepuscular or nocturnal animals. When disturbed during the day, they try rapidly to escape, slightly raising themselves on their feet, holding up the cheliceres ready for defence, and erecting their caudal seta. Thus they progress very fast and soon disappear in any crevice or hole to which they find easiest access. In the evening they progress very quietly, moving their antennular first pair of feet in advance. When disturbed they stretch out these feet in a curve, and close their cheliceres over the mouth as a kind of protection, lying at the same time quite flat and motionless. I saw *T. scabrinus* issuing a peculiar fluid from two internal piloric appendages on each side of the anus, but the fluid did not have any offensive odour.

Mr. Peal of Sibsagar (Assam), who is an able observer and is always ready to give assistance on any subject connected with natural history, writes to me also that the *Thelyphoni* are generally found underneath the bark of decayed wood in groups, rarely singly. When first uncovered they (generally) lie *perdu* and try to pass as some smudge or fungus; lying close and flat, the legs gathered well together and the cheliceres folded in and closed in front of the mouth. On being disturbed they generally start up, throw out and up their cheliceres, gaping wide, erect the tail and invert it so as to feel if possible any object above them; sometimes they throw it quite over between the cheliceres. The first pair of feet, he says, seems to act more as feelers than as organs of progression. These animals seem to move either very slowly or very fast. In raising any fragment offered, they hold it aloft and stand well upon their legs, at least for a time.

Mr. Butler proposed to group the *Thelyphoni* in three sections, according to the number of denticles on the upper antero-interior edge of the second joint of the cheliceres. This is apparently a character of great importance, but like all others it is not without variation. I found that the relative proportions of the joints, particularly of the second, third and fourth, are almost more constant than the denticles alluded to. The form of the large spine on the fourth joint, and in fact the total length and ornamentation of the surface of the cheliceres, and the proportionate length of the feet are at least equally important in distinguishing the species.

The next useful character lies in the form of the anterior part of the thorax, whether it is depressed or rounded, and whether the anterior and lateral eyes are connected by a ridge or not. Next in importance is the form of the first abdominal shield. The length of the tarsi on the first pair of feet is also tolerably constant, and so is the form of the mandibles, but these, as a rule, are difficult to examine.

All other characters relating to the form of the body have a comparatively limited value; the single parts are very uniformly constructed in the different species, and are at the same time very much liable to variation. Thus the width of the abdomen is very variable, (most likely according to the different sexes), and so is the length of the abdominal seta, as regards number and size of the separate joints, etc.

Turning now to the sections, distinguished by Mr. Butler, there are some discrepancies to be noticed in the species referred to them by the author. In the first section, with five denticles on the second joint of the cheliceres, we find among others:

*T. Brasilianus*. I count in Koch's original figure of the species at least seven, almost equal, denticles on the antero-interior edge. Their number, it is true, is not mentioned in the description, but if Koch's figure has been found to be incorrect, the correction should have been noticed. I am not aware that anybody has pointed out an inaccuracy in Koch's figure.

Guerin's *T. caudatus* (in his edition of the *Régne animal*) is identified with *T. Antillanus* of Koch. This is, I think, hardly admissible. Guérin's figure represents a species with comparatively shorter limbs and with the third joint of the cheliceres smooth on the upper surface and much longer, than a comparison of Koch's figure of *T. Antillanus* can bear out. The only reason for the identification of the two figures is, I think, Guérin's note that *T. caudatus* is from the Antilles, but whether that particular specimen was from the Antilles is another question.

The identification of *T. Assamensis* with *T. rufimanus* of Lucas is entirely inadmissible, as I shall point out in detail further on (see p. 134).

*T. proscorpio* of Latreille is an altogether doubtful species, and even should Koch's definition of the presumed same species be adopted, there is no sufficient reason for considering it as identical with *T. caudatus* of Lucas. I shall refer to this question again in the description of *T. scabrinus* (see p. 133).

*T. Linganus*. Koch's original figure gives six denticles on the second joint of the cheliceres, but does not refer to that number in the text. Is the figure incorrect in that respect?

Koch's *T. rufipes* is clearly not the same species as the one originally described by Lucas under the same name. The cheliceres and the limbs are in proportion to the body much longer in the former than in the latter; and, besides that, Koch's species has a slight central keel on the upper side of the

abdominal segments, and on the lower side the first segment is centrally grooved; neither of these characters are mentioned by Lucas, though when describing the respective parts he could hardly have overlooked these prominent characters. I consider Koch's *rufipes* as the same which he describes under the name of *proscorpio*; for the differences which he notices as distinguishing the two are decidedly of no specific value.

In the second group with two denticles on the second joint of the cheliceres, Butler describes *T. formosus*. My specimen of evidently the same species has six denticles of which, however, only two are well marked.

In the third division, including species with six well developed denticles, one is referred to under the old name of *T. caudatus*. I shall attempt to trace the history of this name when speaking of *T. indicus*, (n. sp.), which is possibly the same species as the one referred to by Butler from Madras and Bengal under the name of *T. caudatus*.

In addition to the three sections, I have one species, *T. Beddomei*, from the Anamallies, with seven denticles on the upper edge of the second joint. Among the very large number of specimens of *T. scabrinus*, (n. sp.), I found instances in which the second left joint has occasionally six denticles, while the right one had constantly only five. This clearly shews that the sections solely based upon the character, selected by Mr. Butler, can have only a very limited use.

Thus far I have commented upon Mr. Butler's determinations, but it must be understood that in the above instances my observations are mainly based upon descriptions and figures; for I have no other but Indian specimens for comparison. If those descriptions and figures were found to be incorrect, or not reliable, the mistakes had first to be pointed out and corrected, before a determination, based upon them, was admitted or rejected.

Finally, before entering upon the specific details, I must briefly allude to the geographical distribution of the genus. This distribution extends from South America and the West Indies northwards to Mexico, in a westerly direction through the ocean of little islands to the Philippines, touching North Australia, and stretching North as far as Corea, China and through the Malay Peninsula to Burma and India, where we meet with most of the species in the provinces of Assam and Sikkim, more rarely in Bengal and in South India, including Ceylon, all countries which have a marked admixture of Malayan types. No species is known to occur westward of the country alluded to, not even in Eastern Africa, as far as we know at present. This distribution resembles in so many respects that of the *PASSALIDÆ*, that I shall again return to its discussion at an early opportunity.

The species which I have to notice from India, are :

1. *T. scabrinus*, n. sp.—Cachar, Khasi hills, Assam, Sikkim.
2. *T. Assamensis*, Stol.—Assam, Sikkim.
3. *T. (conf.) angustus*, Lucas.—Sikkim, Martaban (Moulmein), and Penang.
4. *T. formosus*, Butler.—Martaban (near Moulmein).
5. *T. indicus*, n. sp.—South India, W. Bengal, and Jahore, North of Singapore.
6. *T. Beddomei*, n. sp.—South India (Anamallies).

I will make my descriptions as complete\* as possible, and will not only give figures of single parts of the body, but also of the perfect specimens, in order to facilitate the determination by identification and not by guess. Figures of single parts are undoubtedly very useful, but they are not sufficient; they do not convey an exact idea of the relative proportions of all the parts of the body, and without paying due regard to these, a really reliable determination of *Thelyphoni* is in my opinion impossible.

1. *THELYPHONUS SCABRINUS*, n. sp. Pl. XII. Fig. 1.

*The whole upper surface granular; length† of the five terminal joints of the cheliceres equalling the length of the first eight abdominal segments; the length of last pair of feet equals exactly, or very nearly, the total length of the cephalothorax and abdomen; second joint of the cheliceres with five spines, third with a spine on the upper and lower inner edge, and equal in length to the fourth joint; a sharp upper ridge connecting the central and lateral eyes; first lower segment of abdomen of moderate size, depressed, with a broadly convex posterior edge.*

*Hab.*—Sikkim, Assam, Garo-, Khasi- and Cachar- hills.

The cephalothorax is slightly convex, with the anterior ocular portion somewhat higher, but on the whole depressed and flattened, roundly obtuse in front. The two anterior blackish eyes are separated by a moderately levated smooth tubercle; from its anterior edge proceeds a sharp ridge curving outward, and running along the upper edge to the three lateral eyes, which are pale yellow. The ocular portion is more densely and somewhat more coarsely granular than the thoracic one; the former has a longitudinal central groove,‡ and parallel to it an indistinct elevation on either side, placed nearer

\* I know that few would take the trouble of reading them on account of their length, but everybody, who has attempted to determine Arachnoids, will know that a description, unless fully detailed, is worthless for an accurate determination.

† This length is of course measured as far as the joints can be opened without disconnecting the articulation; it is not the aggregate length of the separate joints.

‡ I shall speak of this as the *cephalic groove*, and of the one on the posterior half of the cephalothorax as the *thoracic groove* and the *lateral thoracic depressions*.

to the margins ; the latter has also a longitudinal groove which is most depressed in the centre ; anteriorly from the central depression proceed two lateral grooves to the postocular depressions, and from the centre itself two on either side towards the margin. The sternum is triangular, obtuse in front.

The abdomen is moderately depressed, very elongately ovate, across the middle about one-twelfth of an inch broader than the thorax ; granular above, with the posterior segmental edges crenulated ; the muscular points\* are round and well marked on the second to eighth segment, the three last segments are mostly smooth, the last joint being roundly compressed towards the upper end, with a small vertical and elliptical gland on either side. Below, the first nine segments are finely scrobiculate punctated at the sides, and smooth along the centre ; the first joint is largest, equalling in length the three last ones, with the central portion of the posterior edge somewhat convexly produced ; the second joint is barely curved at the edge and the third, like the succeeding, quite straight. The muscular impressions are elongate and well marked on the fourth to seventh joints, but a little less distinct and more approximate on the first and second joints. The caudal seta very nearly equals in length the whole of the body, it is always peculiarly attenuated towards the end, and all the joints are more or less hairy. The length of the joints and their number is very variable ; the first is as usually the longest, the succeeding either gradually decrease in length, or some of them situated near the middle are longer than the rest.

The cheliceres may be regarded as of proportionate size to the body. The two first joints have each a strong spine in front, provided with a sharp joint and a small denticle on the inner side. The second joint has the upper side depressed, anteriorly moderately produced, with three small denticles on the inner edge, and two larger ones on the anterior one ; the outermost larger denticle is somewhat more distant from its preceding one, than any of the others from among each other, but all are directed forward and inward ; the inner concave side of this joint is coarsely granular, and the lower anterior corner has two denticles, of which the terminal one is the larger. The third joint on the upper side is equal in length to the second, and laterally along the middle to the fourth ; it always has a small denticle on the inner anterior corner, and a larger one in front of the middle of the lower edge. The anterior process of the fourth joint equals in length the fifth joint, it is depressed, smoothish, with a rapidly contracted sharp point and serrated edges, the posterior serration being slightly coarser

\* These points or depressions are very often called stigmatic points, but they have nothing in common with the stigmata, which lie under the edge of the first lower abdominal segment, and are not externally visible ; the depressions are merely places of the inner attachment of the muscular bundles which connect the upper chitinous integument with the lower one.

and beginning with two somewhat larger denticles at the base of the process; this fourth joint also has a minute denticle on the lower anterior corner. The fifth joint is invariably conspicuously shorter and thinner than the fourth, anteriorly with a strong depressed, sharply pointed process which is somewhat more coarsely serrated posteriorly than anteriorly; the lower anterior corner of this joint has two denticles, the anterior of which is somewhat stronger than the corresponding denticle of the preceding joint. The sixth joint, or movable claw, is somewhat longer than the process of the fifth, slightly inwardly curved, sharply pointed, above and below with a finely serrated edge, internally on the concave side with a smooth ridge, and two equally smooth ones are externally on the convex side.

The first pair of feet are thin; the terminal eight tarsal joints are shorter than the preceding metatarsal one. The coxal and femoral joints of the three other pair of feet are thick, depressed, very densely and finely granular.

*Colours.* Full grown specimens are above brown, slightly darker on the cephalic portion of the thorax and on the cheliceres, except near their ends; all the feet from their tibial joints to the end are red, and each joint of the three posterior pairs has near its terminal upper edge a black dot; the last joint of the maxillæ, the ocular tubercle and the claws are black. On the lower side the cheliceres, the prosternum, the abdomen are more or less dark brown, the coxæ of the feet and the sternum are yellowish brown and the feet reddish brown.

The following are the dimensions of a specimen of very nearly the same size as the one figured by Koch as *T. proscorpio*.

|                                                                   |        |
|-------------------------------------------------------------------|--------|
| Total length of cephalothorax and abdomen, .....                  | 37 mm. |
| Length of cephalothorax, .....                                    | 13.6 " |
| " " abdomen, including the three terminal joints, .....           | 23. "  |
| " " cheliceres, measured above, without basal joint, .....        | 17.5 " |
| " " first pair of feet, excluding the basal or coxal joint, ..... | 44. "  |
| " " second ditto, .....                                           | 25. "  |
| " " third ditto, .....                                            | 26.5 " |
| " " fourth ditto, .....                                           | 36. "  |
| " " abdominal seta, ditto, .....                                  | 36. "  |

In young specimens (with a total length of about 20 mm.) the abdomen is often slightly longer in proportion to the length of the cheliceres, but there is not the least difference in structure. The body and cheliceres are olivaceous brown, the process of the fourth joint, the whole of the fifth and sixth joints of the cheliceres red; coxal and femoral joints of all feet olivaceous, the remaining joints and the seta yellowish red. On the lower side, the basal joint of cheliceres is pale brown with the spinal processes red, the three following olivaceous brown, the two terminal red; prosternum

olive brown, coxæ and sternum yellowish brown, abdomen pale brown, feet of the same colour as on the upper side.

The species grows to a large size: the largest specimen from Sikkim has the total length of cephalothorax and abdomen 50 mm.

In Sikkim the species is found from 1000 to about 4000 feet in damp places under wood, more rarely under stones. It is the most common of all the Indian *Thelyphoni*. I have examined about forty specimens of all sizes from 20 to 50 mm., and all exactly agree in structure.

It seems very improbable (judging from the localities recorded by Mr. Butler) that there should be no specimens of this species in the British Museum, but I am not certain whether Mr. Butler refers to it under *T. rufimanus* or *proscorpio*. He must have thought it not worth while reading my description and comparing my figure of *T. Assamensis*, or else he could not have referred it to the present species.

The original name *T. proscorpio* of Latreille (Gen. Crust. et Insect., 1806, p. 130) was, strictly speaking, proposed for Linné's *Phalangium caudatum*. In spite of the numerous references to figures in various old books, it is entirely impossible to trace the species which Latreille had in view. The name would have had to be entirely ignored, but for its timely rescue by Koch who figures a Javanese species under Latreille's name, giving the same synonyms, (Arachniden, Vol X, p. 26, pl. 333, fig 771). Judging from mere figures, we are, I think, justified to regard the species, delineated by Koch, as different from Lucas' *Th. caudatus* (to which I shall refer further on). Koch's *proscorpio* would appear to have the joints of the cheliceres shorter and thicker, the fifth much stronger than the fourth, (while the reverse is observed in Lucas' figure), the centre of the anterior upper abdominal joints keeled, the first, lower abdominal joint very large and with a longitudinal groove. I hardly think that Lucas could have overlooked the last character, when describing the first lower abdominal joint; and besides that in his species he particularly refers to a separate small spine preceding the great spinal process on the fourth joint of the cheliceres; it is indicated in his figure, but not a trace of it is to be seen in Koch's figure. For these reasons, it seems to me clear that we have to consider Latreille's re-established *Th. proscorpio* as distinct from Linné's re-established *T. caudatus*.

Butler also doubtfully refers Lucas' *T. angustus* to his compound mixture of *Th. proscorpio*, but with still less reason, as I shall presently shew.

## 2. THELYPHONUS ASSAMENSIS, Stol. Pl. XII. Fig. 2.

*T. Assamensis*, Journ. A. S. B. Vol. xxxviii, Pt. II, 1869, p. 205, pl. xix, fig. 1.

The whole upper surface granular; the length of the five terminal joints of the cheliceres fully equals the first nine abdominal segments; the last foot is

longer than the cephalothorax and abdomen together; second joint of cheliceres with five subequal spines, four being on the inner, one somewhat more distant on the upper anterior edge; third joint with a single strong spine on the lower median edge, it is longer and slenderer than the fourth joint, whose anterior process is long, subcylindrical, smooth posteriorly, denticulate on the antero-interior edge; a sharp denticulate ridge connects the central with each group of lateral eyes; first lower abdominal segment depressed, particularly in the middle, with the posterior edge convexly produced.

*Hab.*—Assam and Sikkim. The species is much rarer than the previous.

It will be seen from this abbreviated characteristic that the species is very closely allied to the previous, but after having examined several specimens of each, exactly agreeing with each other, I think they must be looked upon as two distinct species. I have already given a detailed description of the present one.

In size and coloration it almost exactly agrees with *T. scabrinus*, but is slightly more depressed, the cheliceres are somewhat more slender and longer. The spines on the second joint are subequal, four on the inner edge, and one distant one on the upper edge; the form of the third joint and the process on the fourth differ essentially, as may be readily seen by a comparison of the enlarged figures of the respective cheliceres. The feet are also proportionately longer than in *T. scabrinus*; the eight tarsal joints on the first pair equal in length their preceding metatarsus. Internally along each group of lateral eyes are two imperfect ridges of granules somewhat parallel to the central cephalic groove.

As regards general form and proportional size of the joints of the cheliceres *T. Assamensis* is also closely allied to *T. caudatus*, as emended by Lucas, but the denticles on the second joint are very different.

Butler (loc. cit. p. 202) considers *T. Assamensis* as the adult of *T. rufimanus* of Lucas. If such identifications were admitted, we might better give up the idea of distinguishing at all species of *Thelyphoni*; a superficial comparison of the respective figures will shew that the cheliceres and limbs of *T. Assamensis* are proportionally very much longer, than could possibly be attributed to a change in age. Lucas particularly refers to the shortness of the cheliceres\* in his description of *T. rufimanus*, their third joint is said to have no spines whatever; the first lower abdominal segment is stated to be very large. Besides that it appears to me, judging from the figure, that there is in Lucas' species no sharp ridge between the central eyes.

### 3. *THELYPHONUS (conf.) ANGUSTUS*, Lucas. Pl. XII. Fig. 8.

? *T. angustus*, Lucas, Guérin's Mag. de Zool. for 1835, pl. 10, fig. 8.

*Cephalothorax and abdomen long and slender, finely granular above; cheliceres in young almost entirely smooth, in old specimens with the exception of*

\* They are much shorter than the abdomen.



*the second joint mostly smooth, the length of the five terminal joints is about equal to that of the first six abdominal segments, which is slightly more than the length of the cephalothorax; the length of one of the last feet, or that of the caudal seta, is considerably less than that of the cephalothorax and abdomen together; cephalic portion of thorax at the sides between the central and lateral eyes rounded; second joint of cheliceres with five denticles, of which the two uppermost are subequal and larger than the three others; third joint not longer than the fourth, with a denticle on both the upper and lower inner edges; first lower abdominal segment depressed, with the posterior central edge somewhat narrowly produced.*

*Hab.*—Penang, Moupin, and Pankabari (Sikkim).

I have six specimens for examination, two from each locality; they all agree in the above characters, and appear to me to be referable to Lucas's species.

The slenderness of the body and the shortness of the cheliceres are very striking distinctions as compared with the two preceding species. The cephalothorax is only about half the total length of the abdomen, with the anterior end somewhat narrowly rounded, convex above, the cephalic portion being more distinctly, though still very finely, granular than the thoracic one; the median ocular tubercle is low, rounded, smooth; the central eyes small, black; the sides between them and the lateral amber-coloured eyes rounded, with a slight longitudinal elevation above the latter. The cephalic groove is distinct, beginning a short distance behind the ocular tubercle. The central thoracic impression is rather large, with a very fine groove passing through it; lateral impressions rather indistinct. Prosteron on the face obtusely keeled with a short anterior broad point; sternum ovately subtriangular, smooth, anteriorly subtruncate.

The first nine abdominal shields are on the upper side very finely granulated, with slightly raised lateral and posterior edges. The muscular rounded pits are well marked from the second to the eighth segment. The lateral kin is densely and very finely punctated and scrobiculate. The first segment has the middle of the posterior edge narrowly produced, and its length laterally is equal to that of the two succeeding ones, all three are broadly laterally punctated, smooth in the middle, while the other segments are mostly smooth, with only a few fine scattered dots.

The caudal seta is always shorter than the total body; it is distinctly hairy in young specimens, but the hairs easily wear off in adults.

The cheliceres are almost quite smooth in young specimens, while in adults the second joint is on the upper side densely punctated, the other joints are very sparingly covered with hair, these becoming, however, more numerous towards the tips. The first joint is flattened, with two anterior diverging processes, each terminated by a short spine, which has the appearance as if it had

been set into the abbreviated end of the process. The remaining five joints are in form, relative size and denticulations, exactly like those of *Th. scabrinus* on a small scale, with the single exception that, as already observed, they are mostly smooth. The eight tarsi of the first attenuated pair of feet are considerably shorter than the preceding metatarsus. The remaining feet have the femoral joints depressed and finely granular above.

Colour of adult, above, blackish brown, somewhat less pure on the abdomen and with the three terminal joints of the cheliceres reddish brown, coxal and femoral joints of all feet olivaceous brown, remaining joints bright red; lower side entirely reddish brown, only the second and third joints of the cheliceres, the points or denticles of all the other joints, the prosternum, the femora, the external margins of the abdominal segments, including nearly the whole of the four terminal ones, are blackish; the shades of brown, however, slightly differ: the last joint of the cheliceres being rather bright red, the first pair of feet reddish brown, the coxæ and sternum yellowish brown and the abdomen chesnut brown; the seta is reddish brown.

Younger specimens have all the upper dark brown as well as the lower reddish coloration paler, but the ends of the cheliceres are bright red and the feet and caudal seta yellowish red. In the four specimens from Sikkin and Penang the femoral joints of the first pair of feet are dark, in the two specimens from Moulmein the whole of these feet are reddish brown.

The largest specimen from Sikkin measures:—

|                                                     |      |      |
|-----------------------------------------------------|------|------|
| Total length (excluding the seta), .....            | 31   | m.m. |
| Length of five terminal joints of cheliceres, ..... | 11   | " "  |
| " " cephalothorax, .....                            | 10   | " "  |
| " " abdomen, .....                                  | 20   | " "  |
| " " first pair of feet (excluding the coxa), .....  | 26   | " "  |
| " " second, .....                                   | 16·5 | " "  |
| " " third, .....                                    | 17 5 | " "  |
| " " fourth, .....                                   | 25·5 | " "  |
| " " caudal seta, .....                              | 26·5 | " "  |

A comparison of my figures and description of the present species with those of Lucas (loc. cit.) will show, that the form of the body, the proportions of the different joints and the coloration agree as closely as could be expected, so much so that I can scarcely doubt the identity of the two. There is only one point in Lucas' description which, although in itself apparently of no very great importance, is contradictory to what can be observed in my specimens. Lucas says that the third joint of the cheliceres is smooth on the upper inner edge, and provided with a spine only on the lower edge, while in all my specimens there is a distinct though very small spine on the upper edge and a somewhat larger one on the lower. As Lucas' type is in the Paris Museum, it will be comparatively easy to settle this point by a re-examination of the specimen.

4. *THELYPHONUS FORMOSUS*, Butler. Pl. XII. Fig. 4.

Ann. and Mag. nat. hist. 1872, vol. x, p. 203, pl. xiii, fig. 4.

*Upper side of body finely granular, of cheliceres nearly smooth, length of the five terminal joints of cheliceres very nearly equalling that of the first nine abdominal segments; second joint of cheliceres on the upper anterior edge with six very small denticles, of which only the two middle ones are pointed, fourth and fifth joints more swollen than the two preceding ones; edge between the central and lateral eyes swollen, rounded, not carinated; length of one of the last feet almost exactly equals the cephalothorax and the abdomen; first lower abdominal segment very large, with the median posterior edge produced, but still truncated, and depressed.*

*Hab.*—Moulmein, (in the Martaban province).

The cephalothorax is comparatively small, its length being only slightly more than half that of the abdomen; it is convex, anteriorly somewhat narrowly rounded, with the cephalic portion behind the ocular tubercle transversely rugose, further on rugosely granular, the granulation being considerably stronger than on the thoracic portion. Ocular tubercle and central eyes small, black. Cephalic groove with slightly raised margins. Edges beginning a short distance behind the central eyes and extending to the laterals broadly rounded and swollen. Median and lateral thoracic grooves and impressions narrow, but distinct and shining smooth. Prosternum narrow, subcarinate; the sternum rather elongately trigonal, anteriorly obtusely rounded, with the sides posteriorly sloping.

The first nine upper abdominal segments very finely granular, with crenulated posterior margins; the muscular rounded pits are distinct on the first eight segments, the three last narrow segments are smooth. Sides punctured, and with small scattered elongated tubercles, of which a median row slightly exceeds the others in size. On the lower side the two first segments are strongly rugose at the sides, the others only punctated, the median portions being smooth, except on the narrow second and third segments on which the punctuation extend almost to the centre. The first segment is largest, with the posterior part centrally produced, but with the edge truncate. The first pair of feet is entirely smooth, the second and third have the femoral joints, and the last all the joints, scrobiculate punctated, the punctuation extending even to the hinder sides of the coxæ.

The cheliceres are sparsely hairy, except on the inner sides and near the tip. Each first joint has anteriorly a strong sharply pointed process. The second joint has on the upper margin six denticles, four being on the inner edge,—the two lower obtuse, the two upper pointed and longer,—the fifth and sixth are on the anterior edge, both very small and indistinct, the last is distant from the rest; the anterior half of the joint is transversely rugose; the lower anterior edge has two subequal very small denticles. The third

joint is slender, slightly longer than the second, with numerous sharp granules on the upper rounded inner edge, and one strong spine in the middle of the lower edge. The fourth joint is not longer but considerably thicker than the third, with a long, inner, rather equally slender, smooth, anterior process, with its termination shortly bifid and internally provided with a compressed tubercle. The fifth joint is equal in length to the preceding, but again more inflated, with a short and broad anterior process, sharply serrated on both edges. The sixth joint is moderately curved, externally grooved and with the upper and lower edges finely serrated, and internally pilose.

The length of the eight tarsi of the first pair of feet is less than that of the metatarsus. The femora of the other feet are moderately thickened and depressed.

*Colours.* Above,—cheliceres and cephalic thorax brilliantly shining blackish brown, remainder of cephalothorax and abdomen dull blackish; maxillæ with the exception of their tips and all feet bright reddish chesnut; caudal seta somewhat deeper red; sides of abdomen fulvous brown. Below,—cheliceres on the first joint dark brown, remaining joint blackish brown, sternum, coxæ and feet reddish chesnut, abdomen darker chesnut.

I have some years ago collected this species near Moulmein, wherefrom Butler's type was received. If the second joint of the cheliceres of the type specimen has no indication of any other but two denticles, the occurrence must be looked upon as an accidental variation. The form of the body and of the cheliceres is so characteristic, that the species cannot be easily mistaken with any other. The following are the dimensions of an apparently full grown specimen :—

|                                                               |      |       |
|---------------------------------------------------------------|------|-------|
| Total length of cephalothorax and abdomen, .....              | 26   | m. m. |
| Length of the first terminal five joints of cheliceres, ..... | 13.5 | " "   |
| " " cephalothorax, .....                                      | 9.   | " "   |
| " " abdomen, ... ..                                           | 16.5 | " "   |
| " " first pair of legs (without coxæ), .....                  | 28 5 | " "   |
| " " second, .....                                             | 15.5 | " "   |
| " " third, .....                                              | 16.5 | " "   |
| " " fourth, .....                                             | 21.5 | " "   |
| " " caudal seta, .....                                        | 19   | " "   |

##### 5. *THELYPHONUS INDICUS*, n. sp. Pl. XII. Fig. 5.

*An Thel. caudatus auctorum !*

*Upper side very finely granular; the first nine abdominal segments, centrally, with a partial, very fine carina; cheliceres mostly smooth, except on the second and third joints which are densely punctated; the length of the five terminal joints of the cheliceres equals that of the first seven or seven and a half abdominal segments; the length of one of the last pair of feet is very nearly equal to that of the cephalothorax and abdomen taken together;*

*a short sharp edge in front of the lateral eyes, not continuing to the central eyes ; second joint of cheliceres with six small, subequal denticles, third not longer than the fourth, with a little spine above and below ; first lower abdominal segment very large, convex, centrally grooved.*

*Hab.*—South India, Western Bengal, and the Malay Peninsula.

The cephalothorax is rather obtusely rounded, with the perpendicular front side perfectly smooth ; the ocular tubercle is also smooth and very high, the circumference round each black central eye being depressed. From the ocular tubercle passes in a curve a rounded edge below the central eye, and after a short distance from this one joins a thin, but sharp and finely serrated, ridge which continues to the lateral eyes ; the latter are pale amber yellow. The upper side of the cephalic thorax is flattened, indistinctly granularly rugose, with a rather small central groove. The thoracic portion is very finely granular and most minutely punctated, with the central depressions distinct, but the lateral ones ill-defined. The abdomen is one sixth broader than the thorax, very finely granular, with a fine central carina, scarcely traceable on the fourth and fifth segments ; all have a posterior submarginal row of very minute granules ; the last three narrow segments are smooth. The first segment on the lower side is very large, smooth, centrally grooved, with the posterior edge somewhat produced and broadly truncate. All the other segments are finely rugose ; the second and third being very narrow.

All the joints of the cheliceres are internally distinctly pilose. The first joint is sparingly punctated ; on the median anterior part it is transversely rugose, terminating with a sigmoid, pointed process. The second joint has an anterior rounded shovel-like edge provided with six subequal denticles, of which the two outermost are more distant from the other four than these among themselves ; on the lower edge there are two unequal denticles. The third joint is short, with a small denticle at the inner upper end and a larger one on the middle of the lower inner edge. Both the second and third joints are densely punctated above and outwardly, and granular below ; the following are mostly smooth. The fourth joint is slightly thicker than the third, with a long, pointed, anteriorly and posteriorly serrated process ; it has no spine on the lower side. The fifth joint is again somewhat more inflated with a short, broad, depressed process, sharply serrated on both sides ; on the front margin of the lower side there is a minute denticle. The sixth joint is slender, considerably longer than the process opposite to it ; the upper and lower inner edges are, as usually, finely serrated, and near the tip there is on the upper edge a conspicuously enlarged tubercle.

The tarsi on one of the first pair of feet are shorter than the preceding metatarsus. The femoral joints of the other feet are compressed, granular

above, smooth below; the last foot is very little shorter than the whole body, and the caudal seta fully equals in length the latter, it is multi-articulate and densely pilose.

Upper side of cephalothorax and abdomen dull brownish black; cheliceres shining deep chesnut, feet and seta bright chesnut. Lower side,—cheliceres same as above, feet, sternum and first abdominal shield bright chesnut, rest of abdomen deeper chesnut.

|                                                     |            |
|-----------------------------------------------------|------------|
| Total length of cephalothorax and abdomen, .....    | 35.5 m. m. |
| Length of the five last joints of cheliceres, ..... | 17.3 " "   |
| " cephalothorax, .....                              | 12.1 " "   |
| " abdomen, .....                                    | 22. " "    |
| " first pair of foot (with coxæ), .....             | 38 " "     |
| " second, .....                                     | 22. " "    |
| " third, .....                                      | 24. " "    |
| " fourth, .....                                     | 33. " "    |
| " caudal seta, .....                                | 36. " "    |

The preceding description and the figures refer to a South Indian specimen which I had received from Major Beddome.

Another specimen was collected by Mr. Ball near Sirgúja in Western Bengal. It agrees with the former in every particular, except that the denticles on the second joint of cheliceres are somewhat stronger, and that the fourth and fifth joints are not so much inflated, both being only slightly thicker than the third.

Several other specimens were obtained by Mr. Wood-Mason's collector at Jahore, at the extreme south end of the Malay Peninsula. These also agree in every point of structure, the proportions of the body, &c., with the type form, but the first, second, third and fourth joints of the cheliceres are more densely punctated, while the tumidity of the fifth is intermediate between the South Indian and the Bengal specimen. The six denticles on the second joint of the cheliceres are well developed, and the process on the fourth is a shade broader than in either of the two Indian specimens.

Judging from the references to the two localities Madras and Bengal, it would seem probable that the present species had been alluded to by Mr. Butler under the name *Th. caudatus*, though the remark referring to the broad body and depressed abdomen would rather apply to the next species.

But here the question arises what is *Thelyphonus caudatus* = *Phalangium caudatum* of Linnæus? Mr. Butler (loc. cit.) gives among others as the reference of *T. caudatus* Linné's Syst., and Fabricius' Ent. Syst. If anybody will look through these references, he will, I think, find very little satisfaction in the definition of *T. caudatus*.

As habitat of the species, Mr. Butler gives Ceylon, Madras, Bengal and Tenasserim, and says that it is a broad, well marked form, having

six teeth on the second joint of cheliceres and a very depressed\* abdomen, and that it has been confounded with two, if not three, other species! Now I confess after having carefully looked over the references alluded to and Mr. Butler's notice, I have not succeeded in tracing Linné's *T. caudatus*, nor will, I think, anybody else do so; and if the species has been confounded by older writers, as no doubt it was, Mr. Butler has only added his share to that confusion.

Let us see whether and how far we might be justified to adopt the name *T. caudatus*.

Linné named a species in 'Syst. naturæ 619, n. 2' *Phalangium caudatum*, which he characterises as '*chelis ramosis, ano setifero*.' In Museum Lud. Reg., 1764, p. 426, the celebrated author describes the same species in detail and gives 'habitat in Java,' quoting at the same time Seba's figures 7 and 8 on pl. 70 of his Thesaurus. To determine anything according to Seba's figures is an altogether hopeless case, but we know that Linné's description of *Ph. caudatum* was drawn up after a Javanese specimen, and we must, therefore, look to Java for Linné's *Ph. caudatum*. When we see through our literature we find, I think, only two descriptions and figures, which can bear out any comparison with Linné's type, and these are Lucas' *Th. caudatus* ex Java, and Koch's *Th. proscorpio* ex India orientali et Java.

In reading carefully over Linné's description, I think, the passages, *corpus ..... ferrugineum, ..... chelæ ..... articulis 5 constructæ ..... β (i. e. articulus tertius) subrotundus, inermis, ... γ (i. e. art. quartus) subrotundus.....* are decidedly more in favour of Lucas's than of Koch's figure. If we, therefore, wish to retain Linné's name we can reasonably, I believe, only adopt it in the form in which it had been introduced into science by Lucas in his Monograph of the genus in Guérin's Mag. de Zoologie for 1835. Any other meaning, which we force upon Linné's name, is more arbitrary than this, still I do not wish to leave altogether the references of previous authors to this name without notice.

I have already (p. 133) stated the reasons, which appear to me to indicate that Koch's reinstated *Th. proscorpio* of Latreille is distinct from Lucas' *Th. caudatus* of Linné.

Fabricius copied Linné. In Syst. entomologiæ, 1775, p. 441, he only added 'habitat in India orientali,' and I do not think it improbable, that several specimens of *Thelyphoni* had been sent by the French and German Missionaries from South India to European Museums.

Pallas' two figures most probably refer to *Th. scabrinus*. He also had Indian specimens.

Latreille, both in his Hist. nat. des Crust., p. 130, pl. lx, fig. 4, and in his Gen. Crust., p. 130, evidently confounded various species from differ-

\* Linné says: abdomen ovato-oblongum, supra et subtus gibbum.

ent parts of the world under one name. He does not give any descriptions.

The figure in Guérin's *Régne animale* would, if correct, represent a species distinct from *Th. Antillanus*, Koch, as already (p. 128) observed.

Douglas and M. Edwards' figure in their edition of the *Régne animale* most likely represents Koch's *T. proscorpio*.

I do not think it would be profitable to go further with this review, even if I had all the old books at hand. I have looked over many of these *historical* figures and descriptions, and if anybody wishes to study the history of the genus, he might do the same, but if he wishes to *determine his species*, he will find it much more profitable, to ignore every reference written prior to 1835, the date of Lucas' Monograph of the genus.

#### 6. THELYPHONUS BEDDOMEI, n. sp. Pl. XII. Fig. 6.

*Upper side of body granular, of cheliceres sparsely punctated; length of the five terminal joints of cheliceres equal to the first eight abdominal segments, these have on the upper side a median thin ridge; second joint of cheliceres with seven denticles on the upper edge; third joint on upper side shorter than the fourth, above and below with a spine; the length of one of the last limbs very nearly equals the total length of the body; a very fine short ridge in front of the lateral eyes; first lower abdominal segment enlarged, along the middle indistinctly grooved, with the posterior edge centrally much produced and rounded.*

*Hab.*—Annamally mountains, South India.

The cephalothorax is much higher anteriorly than posteriorly, rounded in front, with the ocular tubercle prominent, smooth, its posterior portion being separated by a fine incomplete transverse groove from the intra-ocular one; central eyes of moderate size, dull yellowish; lateral eyes amber coloured, with a short, very thin and finely serrated ridge in front of them, disappearing already at the middle of the distance between the lateral and central eyes. Cephalic thorax granularly rugose, shining; thoracic portion conspicuously broader, more finely granular, dull. Cephalic groove deep, median thoracic and postocular pits and lateral groove well developed, smoothish, shining. Sternum elongately semi-elliptical. Abdomen rather broadly ovate and depressed, above granular, with very slightly raised posterior and lateral margins, the first eight segments with a central longitudinal fine ridge. Sides granularly scaly. Lower surface almost smooth, with sparse fine pits; first segment much larger than any of the others, depressedly convex, longitudinally indistinctly grooved, and with the central posterior edge considerably and rather narrowly and roundly produced.

First joint of cheliceres with the usual anterior process, provided with a rapidly attenuated sharp point. Second joint on the upper edge with seven denticles, of which the outermost is the smallest and the median on



the inner anterior corner the largest; below with two subequal denticles. Third joint with a distinct denticle on the upper and a slightly larger one on the lower side, the latter is accompanied by a minute sharp granule. These two joints are above and below rather densely punctated. The fourth joint is more swollen and larger than the third, with a depressed, anteriorly and posteriorly sharply serrated process, and a little spine on the median anterior lower edge. Fifth joint somewhat thinner than the previous, with a quite similar process than on the preceding joint, but slightly shorter, and also with a denticle on the lower side. Sixth joint, or movable claw, long, with the upper and lower inner edges serrated.

Tarsi of first pair of feet slightly shorter than the preceding metatarsus. All other feet with compressed, and on the upper side finely granular, femoral joints. Caudal seta slender, with rather elongated, hairy joints; its length equals that of the whole body.

Body including the seta, above, dark brown, on the cheliceres and on the cephalic portion of the thorax shining blackish brown; feet chestnut; lower side, deepest brown on the cheliceres and on the posterior end of the abdomen, dark brown on the first joint of cheliceres and on the anterior part of the abdomen, and lighter brown on the coxae of the feet and on the sternum.

|                                                         |            |
|---------------------------------------------------------|------------|
| Total length, .....                                     | 40.5 m. m. |
| Length of the five terminal joints of cheliceres, ..... | 19 " "     |
| • " " cephalothorax, .....                              | 11.5 " "   |
| " " abdomen, .....                                      | 25. " "    |
| " " first pair of feet, .....                           | 42.5 " "   |
| " " second, " .....                                     | 23.2 " "   |
| " " third, " .....                                      | 25.5 " "   |
| " " fourth, " .....                                     | 28. " "    |
| " " caudal seta, .....                                  | 39.5 " "   |

The number and distribution of the denticles on the second joint of the cheliceres, the broad abdomen, the form of the first lower abdominal segment, and the slightly longer limbs distinguish the present species from the previous.

### Explanation of plate XII.

Fig. 1. *Thelyph. scabrinus*, n. sp., p. 130; 1a, right chelicere, enlarged twice the nat. size; 1b, four anterior lower abdominal segments.

Fig. 2. *Thelyph. Assamensis*, Stol., p. 133, right chelicere, enlarged twice the nat. size; 2a, four anterior lower abdominal segments.

Fig. 3. *Thelyph. (conf.) angustus*, Lucas, p. 134; 3a, left chelicere enlarged three times the nat. size; 3b, four anterior lower abdominal segments, enlarged twice the nat. size.

Fig. 4. *Thelyph. formosus*, Butler, p. 137; 4a, right chelicere, and 4b, first four lower abdominal segments, both enlarged twice the nat. size.

Fig. 5. *Thelyph. indicus*, n. sp., p. 138; 5a, right chelicere, in twice the nat. size; 5b, four first lower abdominal segments.

Fig. 6. *Thelyph. Beddomei*, n. sp., p. 142; 6a, left chelicere, in twice the natural size; 6b, four first lower abdominal segments.

NOTE ON THE GENUS GYMNOPS, W. BLANF., (LACERTIDÆ),—  
by W. T. BLANFORD, F. G. S., C. M. Z. S.

[Received 12th April, 1873.]

In the Journal of the Asiatic Society of Bengal for 1870, Vol. xxxix, Pt. II, p. 357, I proposed to distinguish a new and peculiar form of *Ophiops* from Chhatisgarh by the subgeneric title of *Gymnops*. The species, to which I applied the name of *Ophiops (Gymnops) microlepis*, differs from the typical forms of *Ophiops* found in India and Western Asia in its more elongate proportions, longer tail, single postnasal and minute dorsal scales.

Dr. Stoliczka has since obtained the same species in other parts of India and especially in Kachh (J. A. S. B. 1872, Vol. xli, Pt. II, p. 90 and Proc. A. S. B. 1872, p. 74), and he has adopted the name *Gymnops* as a generic term, founding the distinction from *Ophiops* mainly on the difference in the character of the dorsal scales, which are much smaller and more granular than in true *Ophiops*, although they are distinctly keeled and imbricate. Quite recently Proc. A. S. B., July 1872, p. 126, Dr. Stoliczka has described a second species *Gymnops meizolepis* from Kalabagh on the Indus. This has somewhat larger scales than *G. microlepis*, but it possesses the same elongate form, the tail from the anus being more than twice the length of the body, and it again presents the peculiarity of a single postnasal instead of two or three as in *Ophiops*.

But the name *Gymnops*, whether considered as generic or subgeneric, cannot be retained for this type of naked-eyed lizards, as it has been twice employed in ornithology, having first been applied by Spix to a South American genus of Raptores, for which, however, an earlier generic title viz., *Daptrius* existed, secondly by Cuvier to a Malayan genus of *Sturnidæ*, allied to *Eulabes*.

Under these circumstances I propose to change the name of the Indian lacertian genus, above specified, to *Chondrophlops* in reference to its somewhat granular scales.



ON *AQUILA BIFASCIATA* AND *AQUILA ORIENTALIS*,—  
by W. E. BROOKS, C. E., ASSENSOLE.

[Received 8th April, 1873.]

I have long had in my possession two specimens of *Aquila orientalis*, Cab., one sent me by Dr. Bree and labelled by Mr. Gurney, and the other from Mr. Dresser. The latter is a *Sarepta* specimen from the Volga region, and the former, from the Dobrudscha.

On returning the Dobrudscha example, which Dr. Bree had submitted to Mr. Gurney, the latter sent the following memorandum.

"The eagle which I have ticketed '*Aquila orientalis*, Cab.,' is identical with that so often sent in collections from *Sarepta* near the mouth of the Volga, and is in fact the only species of Eagle which I have seen from that locality. I have hitherto been in the habit of calling this eagle '*Aquila clanga* of Pallas,' but as Pallas does not appear, by the description of his *Aquila clanga* in the Zoog. Ross. As., Vol. I, p. 351, to distinguish between this eagle and the smaller spotted eagle *A. navia*, and as his measurements, which are given in old French feet, inches, and lines, (for a scale of which see Finsch and Hartlaub's Vogel Ostaf.) agree better with *A. navia* than with the present species, it will perhaps be best to adopt for the present species the name of *Aq. orientalis*, proposed by Cabanis in the Journal für Orn. 1854, p. 369, (note), which though not very well chosen is the next in order of priority and the earliest that can with certainty be applied to this eagle exclusively. The specimen now sent appears by its measurements to be a female, and is in adult plumage; the immature birds of this species being spotted in precisely the same manner as those of *Aquila navia* which is well shewn in Yarrell's figure of the 'Spotted Eagle.'"

I quote this memorandum by Mr. Gurney to shew upon what good authority one of my specimens is named *Aquila orientalis*, and the other, sent me by Mr. Dresser labelled *A. clanga*, *Sarepta*, closely resembles it.

Mr. Gurney's statement, that the immature is spotted like *Aquila navia*, is, as far as I can see at present, a mistake; for we have the bird in India (*A. bifasciata*) and it never in any way resembles *A. navia*.

I have, from the first, been struck by the great similarity of these two specimens to our Indian *Aquila bifasciata*, Gray and Hardwick; but had not till the other day obtained Indian specimens according in every respect, to a feather, with the European examples of *A. orientalis*, above referred to. Now I have, and the accordance is so beautifully perfect, that there is no

alternative, but to come to the conclusion that *A. orientalis* is identical in every respect with *A. bifasciata*.\*

I have now, therefore, three European killed examples of *A. bifasciata*; the third being that sent me by Capt. Elwes, and referred to in "Stray Feathers," Vol. I, p. 291. The two first are in nearly mature plumage, and the third is quite mature; and is the finest specimen of the bird I have seen.

The two sent as "*A. orientalis*" have only slight indications of the nuchal patch; otherwise I should have recognized them at the first glance as *A. bifasciata*, as was the case with Capt. Elwes's Bosphorus bird. This term has, I believe, priority over *A. orientalis*, Cabanis, and if so will be retained for this eagle.

The application of Pallas's term "*A. clanga*" to the same species by some European writers is, I believe, an error, if I read the original description correctly. It appears to refer to our Indian spotted eagle which we accept as *Aq. nœvia*, and which I believe to be the true *nœvia*. Klein, whose work is dated 1750, is the author of the term *Aquila clanga*, and Pallas quotes and adopts this *synonym* in preference to the older term *Aquila nœvia*, Schwenckfeld. This term Pallas also quotes under the head of *Aquila clanga*, but as a *synonym*. Schwenckfeld's work is dated 1603.

In a letter received the other day from my friend Mr. Anderson, he records the occurrence of a lineated *A. Mogilnik* at Aden, which was stunned by flying against the telegraph wires there.

I may as well mention here that the Indian Imperial Eagle, to which I applied Hodgson's term of *A. crassipes*, is identical with the East European bird, *A. Mogilnik*, better known as *A. imperialis*, but the former is the prior term.

I compared our bird with an adult Turkish specimen sent me by Dr. Bree. Mr. Gurney also came to the same conclusion, after comparing the adult Indian birds, I had sent home, with European examples.

The West European Imperial Eagle is, however, quite distinct and is now known as *A. Adalberti*, Brehm. This is the species said to have no lineated stage, and having, when adult, an excess of white on the scapulars and ridge of wing.

\* [Mr. V. Ball and I had the pleasure of comparing the two specimens of *A. orientalis*, referred to by Mr. Brooks, with a series of Indian *A. bifasciata*. They undoubtedly appear to be perfectly identical, both in structure and coloration. If the determination of those two specimens as *A. orientalis* is correct, (and upon such good authority, as Mr. Gurney, it ought to be), there can be no doubt that the two species must be considered as identical. *F. Stoliczka.*]

I sent a fine series of our Indian *Aquila hastata* to the Norwich Museum. Mr. Anderson also sent one example in mature plumage.

Besides these we sent others to ornithological friends. I hear from Messrs. Gurney and Dresser, that the adult plumage of this species is not to be distinguished from that of the small Pomeranian spotted Eagle which they term the true *Aquila nevia*.

They assert, however, that though the adults are alike, the immature birds differ.

This is a point for further investigation, but the perfect accordance of the adults leads me to expect the same in the immature birds. The connection between the immature and the adult is the first point to be established, and this can only be done by the field naturalist.

One of my ornithological friends informs me that the immature of *A. orientalis* (which we have shewn is *A. bifasciata*), has spotted plumage like that of *A. nevia*; another friend informs me he has received the immature bird, and it "is strangely like *A. bifasciata*!" Now the latter eagle is *not spotted*, and the "doctors," who are both men of repute, "differ."

These points will all be cleared up it is to be hoped before long; and we shall perhaps have the natural history of the Eagles as clear and as correct as that of the common Rook, with little or nothing else to be learned. At present the Eagles appear to be in a state of dire confusion, which the English naturalists are daily making worse.\*

\* Since the foregoing was written, Capt G. F. L. Marshall, who is much interested in this subject, came and examined the series used. He fully concurred in the identification of *A. orientalis* with *A. bifasciata*, and was even more positive than I was that the Danzig killed *Aquila hastata* was indeed that species. It will be remembered, it was sent to me labelled "*A. nevia*." My English Ornithological friends with whom I communicated are incredulous regarding my identifications, and I, therefore, refer to my friend's corroboration. If all fails to convince them I shall have the series exhibited at a meeting of the Zool. Society.





*Hemiodus Burmannicus*, Kuhn







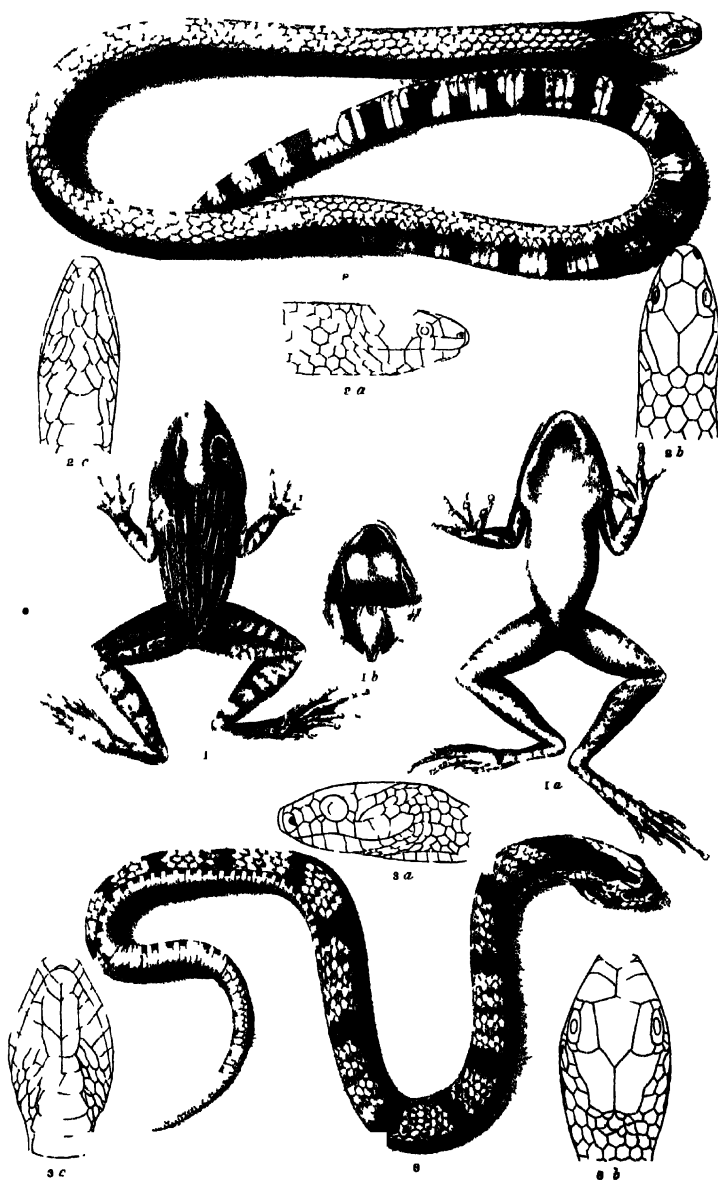
*Hapaline Benhamiana*, Schott





*Stomona Griffithiana*, Kurz



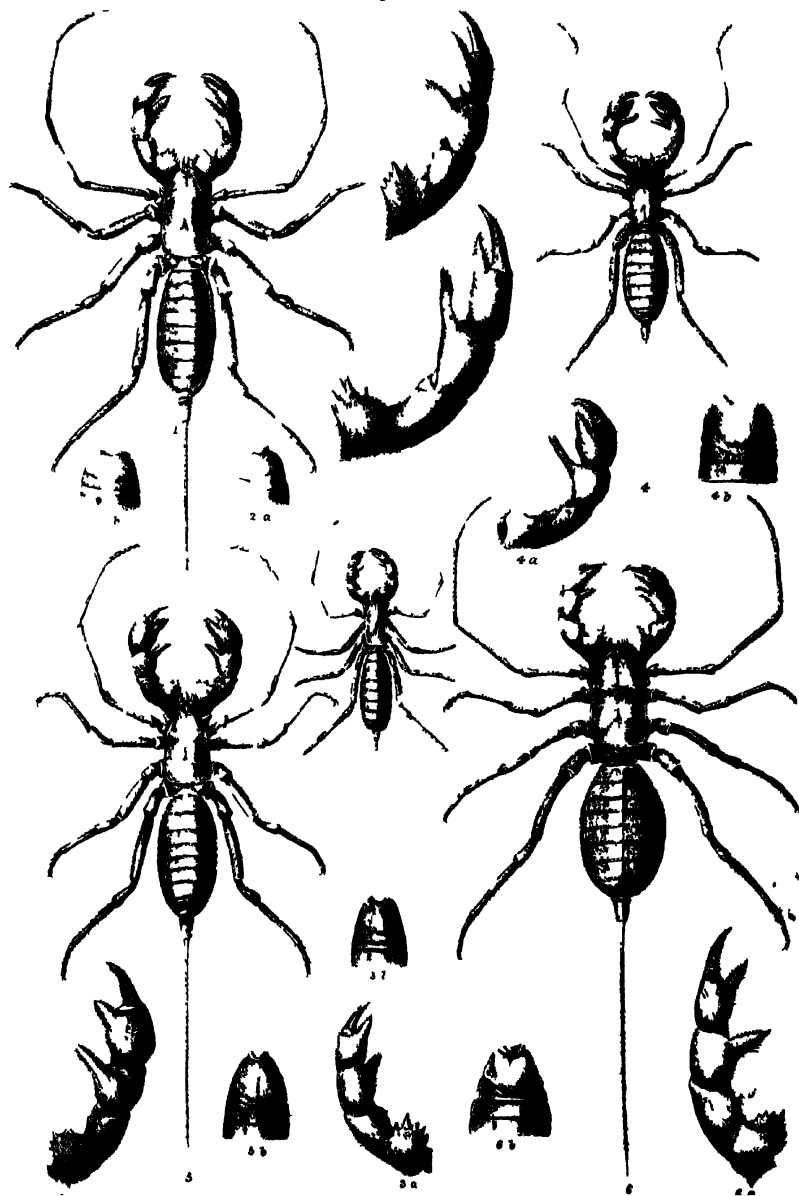


Figs 1 a, 1 b *Rana phaeatella*, n. sp., Penang, p. 116

Figs 2 a a, 2 b, 2 c *Calamaria Stahlknechte*, n. sp., Sumatra, p. 119

Figs 3, 3 a, 3 b, 3 c *Simotes catenifer*, n. sp., Malay Peninsula, p. 121





1 *Th. scabrinus* p 130      4 *Th. firmus*, p 137  
 2 *Th. Asiamensis*, p 223      5 *Th. indicus*, p 230  
 3 *Th. (conf) angustus*, p 134      6 *Th. Boddemai*, p 192  
 See explanation on p 193





# JOURNAL OF THE ASIATIC SOCIETY.

## Part II.—PHYSICAL SCIENCE.

No. III.—1873.

A CONTRIBUTION TOWARDS A MONOGRAPH OF THE INDIAN PASSALIDÆ,—  
by DR. F. STOLICZKA.

[Received 27th April, read 7th May, 1873]

• Some years ago, when I visited my veteran friend Dr. J. J. Kaup in Darmstadt, I found him, quite unexpectedly, busily engaged with PASSALIDÆ. He urged me most strongly to collect Indian specimens, which I did; but the collection progressed so very slowly,—in spite of the very numerous applications which I made for assistance,—that Kaup's Monograph of the family appeared early in 1871\* without my little contribution in the way of Indian materials.

When I saw that the geographical distribution of the PASSALIDÆ is so very peculiar and interesting for the study of our Indian fauna, I resolved to continue my researches, and to publish as far as possible a revised Monograph of all the Indian species, with such little additions to the anatomy and development, as might be obtainable. Of these points I shall, however, not speak on this occasion, they will be fully treated in my Monograph, which will be accompanied with all the necessary illustrations. I will merely mention that in India we meet with PASSALIDÆ in those districts only which have a Malayan fauna. No species is as yet known from the Himalayas west of Nipal, or from any part of Central India or the Panjáb.

The object of the few following lines is chiefly to give a list of the Indian species with authenticated localities, together with diagnoses of the new species which had lately come under my observation. I am sorry that I cannot complete more fully the task which I undertook, but in the middle of pre-

\* Berliner Entomologische Zeitschrift, vol. xv.

parations for an expedition to Central Asia I am not allowed to do more, than to shew those who assisted me that their materials had been duly appreciated. My old friend Dr. C. Felder, the Lord-Mayor of Vienna, has sent me the whole of his collection of PASSALIDÆ for examination, and Dr. L. Redtenbacher, the Director of the Vienna Museum, sent me a great number of eastern species. These are rare instances of liberality and true interest in the work. My thanks are further due to Messrs. W. S. Atkinson and J. Wood-Mason, Messrs. Peal (Assam) and Mandelli (Darjeeling), Major H. H. Godwin-Austen, Major Beddome, Mr. Stahlknecht of Singapore, Mr. Theobald, Rev. Baker, Dr. Cameron, the late Dr. Walter Abbey and the late Capt. Mitchell of Madras. The original collection in our Museum contained only five of the commonest species.

In recording the species I will follow Kaup's last Monograph on the subject. Whatever opinion various naturalists may have regarding the mode of classification which that distinguished author has adopted, I do not think that they will find much fault with the limitation and characteristics of the genera\* and species. Undoubtedly that Monograph is the most complete and the most remarkable paper which the philosophical school of naturalists has in late years produced. I am now not prepared to say anything for or against it, but I will do so in my Monograph, when I hope to have examined a larger number of PASSALIDÆ, than I had been able to do up to the present. Such mental productions† must not be disposed of with prejudice, they are entitled to receive a fair trial and a full share of all opinions *pro* and *con*, before we side one way or the other. Nobody will, after careful perusal, deny the fact, that Kaup's classificatory arrangement has in many respects very considerable advantages; it is easy and practical, but time and research must shew whether it can be adopted or not. Whenever I shall have any scruples against generic definitions, or against the quinquennial divisions, I shall state my reasons without any reference to the validity of the whole system.

Before proceeding to the details I have only to mention that I shall include in the present list all the species known to occur in the East Indies, *viz.*, India proper (Vorder-Indien), with Eastern Bengal, Burma, and the Malay Peninsula as far south as Singapore (Hinter-Indien).

### *Sub-fam. AULACOCYCLINÆ.*

#### 1. AULACOCYCLUS PARRYI, Kaup.

I received numerous specimens from Malacca.

\* Even in the very limited sense in which the author defines them.

† For a short exposition of the principles of the system, and a brief discussion thereon, see Proc. of the Society for May, 1873.

2. *CERACUPES AUSTENI*, n. sp.

This species possesses all the characteristics of the genus, as given by Kaup. Total length 22 m.m., width of head 4·8, of prothorax 6·6, of wings at the shoulders 6·8, length of elytra 12·3 m.m.

In general structure it is very like *C. fronticornis*, but the clypeus-horn is obtusely rounded at the end, not emarginated, the upper concave edge is punctated, longer and narrower than in that species. The processes on the jaws are posteriorly flattened and rugosely striated, anteriorly convex and smooth. The lateral scar of the prothorax forms a punctated S. Scutellum smooth, waist at the sides densely punctated.

The furrows of the wings are coarsely punctated, without any perceptible hair. The metasternum is convex, generally smooth, only along lateral margins finely punctated. The median tibiae have externally two spines, the posterior ones only an indication of a small point.

*Hab.*—Naga hills, North Eastern districts of Bengal. Major H. II. Godwin-Austen found a couple of specimens at an elevation of 6000 feet.

I have never received *C. fronticornis* from any of these districts. It must come from the Chinese portion of eastern Tibet, for western Tibet has no forests.

3. *COMACUPES CYLINDRACEUS*, Perty.

- *Hab.* Johore, at the southern end of the Malay Peninsula. One specimen measures: total length 26·4 m.m., width of clypeus 5·5, (Kaup gives 7 m.m.) width of prothorax 8, (Kaup gives 9), length of elytra 14·9 m.m., (Kaup gives 25½, which is clearly a mistake for 15·5 m.m.).

Kaup's specimens from Malacca appear to have had a much broader clypeus and prothorax, but the two Johore specimens which I examined agree with the description of the species in every other detail.

4. *COMACUPES MASONI*, n. sp.

Total length 30·5 m.m., width of clypeus 6·4, of prothorax, or shoulders, 9·1, length of elytra 16·75 m.m.

Resembles *C. basalis*, but is much more slender; upper lip with the front surface sloping, but scarcely indented at the edge; densely hairy. Clypeus densely punctated and shortly hairy, except in front of the horn, which is large, compressed, strongly projecting in front and very slightly elevated, with an obtuse end sharpened from below, its posterior end is almost vertical without a free point, the upper ridge is obtusely rounded, except for a short distance along the middle which is concave and rugose. Prothorax with the lateral scar small, smooth, with a little dot in front of it, as in *C. cylindraceus*, but in the present species the marginal furrow is in front near the corner almost angularly bent in. The furrows on the wings are slightly more coarsely punctated, than in the last species.

Scutellum and the waist at the sides and the whole of the lower side densely punctated and shortly hairy. Lower lip densely and coarsely punctated and hairy, with barely an indication of a central carina. The last four abdominal segments almost quite smooth. Middle and hind tibiae each with a strong spine.

*Hab.*—Johore, obtained by Mr. J. Wood-Mason.

Kaup quotes *C. cavicornis* from Malacca and Penang. I have not seen it, but there is a specimen of a *Comacupes* in Dr. Felder's collection, evidently belonging to a new species.\* Its locality is given as Bras., which clearly means Brasilia, there is, however, no such form described from America, the specimen came much more likely somewhere from the Philippines.

5. *TENIOCERUS PYGMÆUS*, Kp.

Malacca. I have as yet obtained only a single specimen.

6. *TENIOCERUS BICANTHATUS*, Guér.

Johore, north of Singapore.

7. *TENIOCERUS BICUSPIS*, Kp.

Sikkim, Assam and Cachar hills. Common. Kaup also gives Malacca.

*Sub-fam. ERIOCNEMINÆ.*

*First group. SOLENOCYCLÆ.*

8. *PLEURARIUS BRACHYPHYLLUS*, n. sp.

Total length 43, width of clypeus 9·8, of prothorax 12·5, length of elytra 14·2; total length varying from 41 to 44 m.m.

\* *Comacupes Felileri*, n. sp. Total length 22·5, width of clypeus 5, width of prothorax 6·6, of shoulders 6·8, length of elytra 13·2 m.m. Upper lip in front and laterally deeply concave, as in *Aulac. teres*. Jaws with the upper of the three front teeth very small. Clypeus smooth, with a fine groove along the anterior straight margin. Horn situated far behind, as in *basalis*, rising almost vertically, slightly inclined forward, behind with a convex, smooth, simple and rounded edge; anteriorly below the point it is first vertically truncated, then concave, falling with a broad surface to the large forehead. Ocular ridge sharply angular in the middle, terminating with a small sharp point in the anterior corner of the clypeus.

Prothorax with a median groove, deepest about the centre, and a punctated, complete marginal furrow, only slightly bent in anteriorly; lateral scars small, sub-semilunar, deep, finely punctated. Wings in the furrows indistinctly punctated, not hairy. Scutellum smooth, waist at the sides finely punctated, below entirely smooth as is also the case with the metasternum and the abdominal segments. Tongue with a central carina and with the lower halves of the sides somewhat concave and roundly dilated. Lower lip smoothish in the middle, with a central impressed projection in the front edge; its lateral branches densely punctated. Tibiæ of the front feet very broad, each with six denticles; middle and hinder tibiæ stout, each with a sharp spine.

Jaws bidentate at the end ; upper lip truncated in front, covered with red stiff hairs. Antennæ long, with only three short terminal lobes. Clypeus uneven, but not punctated ; the central horn is flatly convex, smooth, transversely very elongately subtriangular, anteriorly with a small projection, ending in a small free point, from which diverge in a slight curve the frontal ridges, terminating with distinct tubercles near the front edge. This frontal edge has a sharp process above each of the two lateral margins of the upper lip, the left appears to be occasionally a little larger than the right one, recalling a similar structure in *Basilianus*. The two frontal tubercles are connected by a low ridge and the margin between them is deeply concave. Supraocular ridges with a sharp point above each eye, flattened in front, and externally at each corner terminating with a small spine.

Prothorax moderately convex, with a distinct central groove, but not extending anteriorly to the margin ; marginal furrow narrow, finely punctated ; lateral scar forming a shortly elongated and smooth impression.

Scutellum at base finely punctated and hairy, along each side of the centre finely strigated. Waist laterally densely punctated, below smooth, somewhat transversely rugose, but without any special scar.

Elytra with the shoulders somewhat swollen and projecting, smooth ; all the furrows distinctly punctated.

Tongue long, with a median and two marginal ridges, strongly contracted in the lower half. Lower lip with its branches entirely punctated and hairy, slightly depressed in the middle.

Metasternum laterally densely punctated, but the posterior sloping corners are smooth, which is also the case with all the abdominal segments.

Prothorax at the lateral lower sides, and the median femora, covered with dense, long, rufous-brown hair ; anterior femora, sides of metasternum and hinder tibiae a little less hairy.

*Hab*—Nilgheries and Malabar. I received originally two specimens of this species from the Madras Museum, but since then several others have been sent to me by Major Beddome and Rev. Baker.

Kaup describes a single species, *P. pilipes*, from Sumatra. The generic characteristics have to be slightly altered, but in all essential points the South Indian species agrees with *Pleurarius*.

#### 9. SEMICYCLUS REDTENBACHERI, n. sp.

Total length 25·4, width of clypeus 5·2, of prothorax 7·3, of shoulders 7·1, length of elytra 14·3 m.m.

Jaws rather short, each with three denticles ; antennæ moderately elongated, the three terminal lappets well developed and equal ; upper lip squarish hairy, very slightly concave at the front edge.

Clypeus rugose, punctated on the forehead, front edge very slightly emarginate in the centre, and with a small projection above the edges of the

upper lip. The horn originates in a slightly convex smooth tubercle, and extends freely and almost horizontally to near the front edge, its base is posteriorly and at the sides surrounded by a slight furrow, and from the point where the horn becomes free originates on either side a low, indistinct ridge, which makes a curve anteriorly and terminates in a small tubercle some distance short of the marginal projections. Supraocular ridges undulating, each with a sharp point above the eye and another at the anterior corner of the clypeus.

Prothorax convex, with a central groove; marginal furrow incomplete, punctated, terminating anteriorly, some distance from the central line, with an elongately ovate scar. Lateral scar large, slightly impressed, composed of a number of irregularly arranged, coarse pits; a few dots exist near the anterior corner.

Scutellum very finely punctated at the base; waist laterally densely punctated, below nearly smooth.

Elytra rather depressed above, but comparatively high; all the furrows coarsely pitted; each shoulder with a tuft of brown hair, which also extends a little posteriorly along the margin.

Tongue with three ridges, minutely punctated, tridentate at the front edge which is slightly narrower than the base. Lower lip transversely rather elongated, smooth, convex, with a rounded scar at each end; the lateral branches densely punctated. Metasternum on the posterior sloping corners' coarsely punctated. Abdominal segments with an oblique furrow on either side, but in other respects nearly smooth.

*Hab.*—Ceylon. The only specimen examined is in the Vienna Museum; it was obtained by the late Mr. Zelebor during the Novara expedition.

The species almost perfectly agrees with the characteristic of the genus as given by Kaup.

#### *Second group.* LEPTAULACEÆ.

Out of the five genera distinguished by Kaup only one is represented in India, namely *Leptaulax*. It seems to be a little too closely allied to *Ciceronius*, and still more so to *Didimus*. From the last it is stated to differ by the single denticle in the centre of the front edge of the clypeus, while *Didimus* has two; but I have in a few instances also observed two denticles in both *Lept. bicolor* and *dentatus*. Of course we may say, what is in *Didimus* the rule, is an exception in *Leptaulax*, still it looks rather a little arbitrary to define genera in such cases. However, as I have not a single one of the species of *Didimus*, described by Kaup, for comparison, I do not wish to propose any changes in the genera, as characterized by him. Looking at *Leptaulax* in Kaup's sense, it seems to me somewhat doubtful that the number *five* will suffice to include all the different forms which must belong to the genus. The following details, taken with those of Kaup, may speak for themselves.

10. *LEPTAULAX DENTATUS*, Fabr.

The typical small form was obtained from Sikkim, Bútán, Assám, Tenasserim (at Mergui) and from Johore. In the Vienna collections it is represented from nearly all the Philippine islands.

The larger form, or *L. Timorensis*, is also very abundant in Sikkim (between 500 and 1000 feet), Bútán, Assám, Naga hills, Pegu (near Tonghú), and on the Andaman islands. It grows up to 37 m.m. I had very large numbers of both forms for comparison, and came to the conclusion that no definite characters exist by which the two species could be separated. I have all intermediate sizes from 21 to 37 m.m.

11. *LEPTAULAX BICOLOR*, Fabr.

Very common in Sikkim and through the whole of the Malayan Peninsula, as well as on the Andaman and Nicobar islands, in Malabar and in Ceylon. From the last locality two specimens exist in the Vienna Museum collection under the name of *Nietneri*, M. C.

A peculiar small variety, possessing cross bars in the lateral furrows of the elytra, instead of simple dots, occurs at Johore.

12. *LEPTAULAX PLANUS*, Illig.

This is, I think, a good species, the smallest of all our eastern PASSALIDÆ. It is very much more depressed, than either of the previous species, and in proportions and relative size of the prothorax and of the elytra it more closely resembles *dentatus* than *bicolor*, of which it is stated to be a synonym. Specimens from Java, Johore, and Malacca, whence I have lately obtained large numbers, measure between 13 and 14 m.m., but a somewhat larger variety occurs in Burma and on the Andaman islands. Specimens from these last localities measure 18 m.m., they are in almost every other respect identical with typical *planus*.\*

Of the third group, the *ERIOCNEMINÆ*, no species as yet occurred within our limits. I received *Vellejus Moluccanus* from Amboina, *Eriocnemis monticulosus* from Sumatra, and gigantic specimens of *Erioc. tridens* from Java, but none from Siam or Malacca, which localities are also given by Kaup. The last species will have, therefore, to be included in our list.

*Fourth group. MACROLINÆ.*13. *MACROLINUS LATIPENNIS*, Perch.

Malacca; apparently rare.

14. *MACROLINUS WEBERI*, Kp.

Johore; a single specimen from Mr. J. Wood Mason.

\* In Dr. Felder's collection I find a Malacca specimen named *paavilus*?

Dr. Redtenbacher (Coleopteren, Reise Oest. Fregatte Novara, 1867, p. 49) gives *Mastachilus politus*\* from Madras. There is a specimen of that species in the Vienna Museum collection, marked *Ind. or.*, and is most likely the one referred to by Redtenbacher. I very much doubt, however, that it is Indian. It was probably received from the Madras Museum, or from a collector, during the stay of the Novara at Madras. My reason for doubting the correctness of the Indian locality is based upon an observation which I made. I asked the Curator, the late Capt. Mitchell, for the loan of any specimens of *Passali*, he might have in the Madras Museum. I was promptly responded to, and shortly after received four specimens of *Passali*. Two proved to belong to a new species *Pleurarius brachyphyllus*, and the two others were *Solenocyclus exaratus* (known from Madagascar) and *Mastachilus polyphyllus* (from Australia).† After detailed inquiry Capt. Mitchell informed me, that the two first specimens (distinguished by numbers attached to them) were truly Indian, from the Nilgherries, but that the localities of the two others were unknown. They had been received from some old European collection. It seems to me very probable that something similar happened with the specimen of *M. politus*, obtained by the Novara at Madras.

Kaup describes *Macrolinus Waterhousei* and *Episphenus Moorei* from Ceylon. I have not seen either of these.

#### *Fifth group. ACERALE.*

Of the five genera, *Laches*, *Gonates*, *Aceraius*, *Cetejus*, and *Basilianus*, only the third and fifth have as yet been found in India; they are common and numerous, and the specific number of five will, I am sure, run short for what is in this case really required for specific determination, unless the genera are somewhat differently defined and grouped.

Of the other genera I have examined a few interesting species. Among these is one which Kaup would probably call the first, *moderately convex*, species of *Laches*, and the largest species of *Cetejus*; both answer exactly the characters of the respective genera. I add descriptions of the two new species‡ in a foot note.

\* Originally described by Burmeister from Van Diemen's Land.

† The Vienna Museum possesses two specimens of *polyphyllus* from China.

‡ *LACHES GRACILIS*, n. sp. Total length 26, width of head 5.5, of prothorax 7.5, of shoulders 7.6, length of elytra 15 m.m. Whole body moderately convex.

Upper lip almost quite straight in front; left jaw barely longer than the right one. The three first lobes of the antennæ short, the fourth slightly shorter than the fifth. Clypeus on its posterior half rugosely punctated; the short horn rises from the anterior central edge of a transversely elongated, smooth protuberance; from it proceed under a narrow angle the frontal carinæ, each terminating in an elongated smooth tubercle, or rather short ridge, connected by a very fine carina. The marginal tubercles of the clypeus are pointed, depressed, placed nearer to each other than the width of the



A specimen of *Gonates naviculator* from the Moluccas, in Dr. Felder's collection, has the middle frontal carina very distinct, while two others of

upper lip, they are unequal, the left being slightly larger than the right one; they are not in any way connected with the frontal tubercles, but a smooth concave field proceeds from each of these to the respective ocular ridge. The latter is angular or sub-tubercular above each eye, and anteriorly formed by a thin carina, terminating on the angle of the clypeus with a little spine.

Prothorax somewhat broader posteriorly than anteriorly, with a very distinct central groove; marginal furrow very narrow, with a minute punctation; lateral scars vertical, subovate, punctated; a group of distinct dots also exists above each anterior corner.

Scutellum smooth; waist laterally punctated. All the furrows of the elytra coarsely punctated, without a trace of any kind of hair.

Tongue tricarinate, the middle carina the strongest; laterally slightly concave. Lower lip convex, smooth, with a transversely elongated, small, marginal, smooth scutellum between it and the tongue; branches coarsely punctated. Waist, below, with a small oblique, ovate scar on either side. Metasternum on the posterior part sparsely, on the sloping corners densely punctated. Abdominal rings each with a linear, punctated scar on either side. Prothorax, below, as well as the middle and hind tibiae, sparsely covered with yellowish rufescent hair.

*Hab.*—Batchian island; a single specimen in the Vionna Museum.

*CETREJUS AUSTRALIENSIS*, n. sp.

Total length 33, width of head 7, of prothorax 9.9, of shoulders 9.6, length of elytra 19.2 m m. Whole body rather depressed

Left jaw slightly longer than the right one. Upper lip deeply emarginate, the right half being slightly shorter and a little more rounded than the left one, as in *G. naviculator*. Antennæ with six lappets, the two first being very short, the third a little shorter than the three terminal ones, which are subequal and rather slender. Clypeus entirely rugose; the horn is elongated, with a triangular tubercle on each of its basal halves. The frontal ridges issue from the horn under a moderately obtuse angle, (as in *Lept. dentatus*), and terminate with distinct points, connected by a very fine carina, from which the margin of the clypeus descends almost vertically. Both marginal tubercles are pointed, similarly formed, but the left one is conspicuously larger than the right. Each frontal tubercle is connected by a short carina with its corresponding marginal one, and besides also with its corresponding small tubercle in the middle of the supra-ocular ridge, each of which is truncated in front.

Prothorax slightly broader posteriorly than anteriorly, with a fine but almost complete central groove; sides entirely punctated, lateral scar small and rounded; marginal furrow very narrow.

Scutellum smooth, with a central basal groove; waist laterally punctated. The four central furrows of the elytra on the upper side indistinctly, the remainder distinctly, punctated, those at the sides at least twice as broad as the ridges separating them and with distinct transverse bacilli. This structure very strongly reminds one of *Basikanus cancrus*, which is also the largest species of its genus.

Tongue tricarinate, laterally concave. Lower lip convex and smooth, with a small elongately semi-elliptical scutellum between it and the tongue; a small but distinct scar on each side of the lower lip, its branches rather larger, rounded at the ends and somewhat inwardly curved, entirely but not very densely punctated. Prosternal

the same species in the Vienna Museum collection from Amboina (marked *Doleschali*, M. C.) have merely a trace of the middle frontal carina, and the prothorax is comparatively smaller.

*Gonates Germarii* was received by Mr. W. S. Atkinson from Java. Kaup describes *Laches Comptonii* from Ceylon. I have not seen it.

#### 15. *ACERATUS GRANDIS*, Burm.

This is a very common species in Sikkim, Assam, the Naga and Cachar hills. Indian specimens exactly agree in structure with the large Javanese type form, but their usual size is only 40 m.m., and I never saw one exceeding 45 m.m. In Javanese specimens generally only the ninth and tenth rib of each wing are punctated and hairy near the shoulder, while Indian specimens have, as a rule, the whole of the seventh and ninth rib punctated; it is very rarely that the pits entirely disappear on the seventh.

#### 16. *ACERATUS EMARGINATUS*, Fabr.

An extremely variable species, both in general size, as well as in the shape of the two marginal processes of the clypeus; the left one being sometimes sharply pointed at the end, or scarcely bipartite, as in *Percheron's pilifer*. The seventh and ninth ribs of the elytra are as a rule entirely punctated, very rarely is the seventh smooth. The smaller forms, between 30 and 38 m.m., are, I think, mostly males, they have the furrows of the wings perceptibly punctated; the larger specimens, about and above 40 m.m., appear to be mostly females, the furrows of their elytra are almost devoid of punctations.

The species occurs in Sikkim, Assam, Cachar, but is much rarer than *A. grandis*. I also obtained it on Penang hill, and from Johore; in the Vienna collections are specimens from China, Luzon, and Manilla.

Redtenbacher's *Passalus Nicobaricus* from Sambelong (Great Nicobar) is also undoubtedly this species, and neither a *Macrolinus* nor a *Basilianus*.

The next genus, *Basilianus*, is the most numerous in species. I possess specimens of the four species described by Kaup, and three others which I must regard as new. This is as yet almost the only instance in which I have been obliged to transgress Kaup's limit of five species. I took considerable pains to ascertain whether these species could possibly belong to any of the other genera of *Eriocneminae*, but they do not answer to the characteristic of any

process between the anterior coxæ grooved. Waist, below, smooth, with an elongated scar on either side. Metasternum smooth; on the sloping corners rugosely punctated. Sides of abdominal segments and the posterior part of the last segment mostly finely punctated. No hairs are seen on the elytræ; the middle tibiæ are moderately hairy, the hind ones somewhat less so.

*Habitat*—Australia; a single specimen in Dr. C. Felder's collection.

other genus than *Basilianus*. They differ from *Aceraius* by the absence of hair at the sides of the elytra, and from the other genera of the *Aceraius* in the shape of the lower lip and the want of a scutellum between it and the tongue; the same character holds good in a comparison with *Mastachilus*, and the unequal lappets on each of the antennæ readily separate them from the other *Macrolinae*. The seven species may, however, be divided into two sections, as follows:

a. With the marginal processes of the clypeus very asymmetrical,—*Nilgheriensis*, *inequalis*, *Cantoris*, *Indicus*.

b. With the marginal processes of the clypeus very slightly or scarcely asymmetrical,—*cancrus*, *Andamanensis*, *Sikkimensis*.

17. *BASILIANUS NILGHERIENSIS*, Guér.

The usual size of Malabar specimens is only 28 m.m.; it does not appear to be a common species.

18. *BASILIANUS INEQUALIS*, Burm.

Common at Malacca. Kaup gives it from Singapore and Penang. The largest specimen which I have examined is nearly 30 m.m., and the smallest 24·7 m.m., the length of the elytra being 13·7, width of head 5·5, of prothorax 6·9, the proportionate size of this last being often remarkably small.

19. *BASILIANUS CANTORIS*, Hope.

The usual size of Sikkim and Assam specimens is 33 to 35 m.m. Kaup gives it also from Malacca and Cambodja.

20. *BASILIANUS INDICUS*, n. sp.

Total length from 33 to 40 m.m., one specimen is 37·6, width of its head 9, of prothorax posteriorly 12, of shoulders 11·5, length of elytra 21·5 m.m.

Left jaw slightly straighter and longer than the right one. Upper lip widely and rather deeply emarginate in front. Antennæ, with the three terminal lappets longest and subequal, the second and third about half the length of the fourth, and the first is very short, sometimes scarcely traceable. Clypeus rather large, mostly smooth, or sparsely punctated, with the supra-ocular ridges anteriorly truncated with an inward slope, the inner edge of the slope being sometimes very indistinct, while the outer one is sharp, and projects at the corners, somewhat as in *Aceraius grandis*. The horn rises out of a transverse long tubercle, it is subpyramidal, the posterior slope being gradual, the anterior vertical; the frontal carinæ are very fine, forming together a wide semicircle, each terminating in a blunt tubercle, and from each proceeds a very fine carina to the respective marginal process of the clypeus; the left process is the longer, depressed, inwardly bent, obtuse at the end; the right one is thick, short, obtusely pointed.

The prothorax is moderately convex, as in *Cantoris*; it is conspicuously wider posteriorly than anteriorly, with a central groove which is almost as complete, as it is usually to be found in American forms and in these only; marginal furrow anteriorly somewhat widened, bent in and punctated; lateral scar small, rounded, generally with a few pits; the sides of the prothorax are either quite smooth (in the larger specimens), or punctated in front of the scar and at the anterior corner (in the smaller specimens). Whether this is a distinction of sex I cannot say.

Scutellum centrally very minutely strigated; waist laterally densely punctated. Shoulders slightly thickened, only anteriorly with few very short and thin hairs. Furrows of the elytra, above, slightly, laterally distinctly punctated; without hair.

Tongue tricarinate. Lower lip in the middle somewhat convex, mostly smooth or punctated, anteriorly sometimes slightly indented; its branches densely punctated. no scars exist on it. Waist, below, smooth, with elongated diverging, dull scars. Metasternum smooth, its posterior sloping corners rugosely punctated, its sides entirely hairy. Abdominal segments laterally with linear scars.

Prothorax posteriorly, below, covered with brown hair; middle tibiæ very densely, posterior ones less hairy.

*Hab.*—Nilgheries and Malabar. I received several specimens from Major Beddome, Rev. Baker, and Surgeon Major F. Day.

21. *BASILIANUS CANCRUS*, Perch.

The largest specimen in my collection is 45 m.m. It has as yet only been obtained in Nipál, Sikkim, Bútán, and Assám.

22. *BASILIANUS ANDAMANENSIS*, n. sp.

Total length 32 to 38 m.m.; one measures 35·6, width of its head 8, of prothorax 10, of shoulders 10·2, length of elytra 21 m.m.

Jaws almost equal. Upper lip straight in front or obliquely truncated, the left rounded corner being often a little more projecting. Lappets of the antennæ generally graduated, the first very short, the succeeding to the fifth gradually longer. Clypeus entirely punctated and covered with short hair; supra-ocular ridges low, distinctly truncated in front and with the carina round the concave space well developed. The horn consists of an elongated ridge, with a small tubercle on either side; it is slightly elevated at the anterior end and with an almost vertical slope. The frontal carinæ are rather short, terminating with elongated distinct points, connected by another carina, from which the margin of the clypeus is almost vertical. The marginal processes of the clypeus are far distant, situated above the edges of the upper lip; they are short, pointed, in some specimens apparently almost equal, in others the left one is distinctly larger. They exactly resemble those

of *cancrus*, and each also has on its lower side a small tubercle. From both the marginal processes and the frontal tubercles generally proceed a few irregular low ridges to the middle of each supra-ocular ridge.

Prothorax moderately convex, smooth, generally with a very faint indication of a central groove; lateral scar rounded and, like the entire lateral margins, very finely punctated; sometimes there are one or two dots at the anterior corner.

Scutellum smooth, convex, sometimes with a minute punctation along the lateral edges. Shoulders well prominent, and each with a group of short brown hair, considerably more developed than in *Cantoris*. Furrows of the elytra finely punctated; all the ridges smooth.

Tongue tricarinate. Lower lip large, mostly smooth, without any scars; its branches densely punctated. Prosternal carina sharp, long. Waist with elongated diverging scars, sometimes with a short, central, basal groove. Metasternum smooth, its hinder corners sparsely and very finely punctated; sides densely punctated and hairy. Abdominal segments smooth, with linear oblique scars. Middle and hind tibiæ rather thinly hairy; lower sides of prothorax more distinctly so; last abdominal segment at the end provided with conspicuously elongated brown hair.

*Hab.*—Andamans near Port Blair; Camorta and Katchal islands of the Nicobar group; common. I found one specimen in the Vienna collection, \*together with *Mastachilus politus*, labelled 'Madras,' 'Novara.' It was most likely obtained from some officer who had been at the Andamans, or from the Museum.

23. *BASILIANUS SIKKIMENSIS*, n. sp.

Total length 33, width of head 7.1, of prothorax or of shoulders 10, length of elytra 19 m.m.

This species resembles *B. Cantoris* in size and general character of form and convexity of the body. The jaws are subequal; the upper lip obliquely truncated, almost quite straight, with obtuse corners. The three first lappets of the antennæ much shorter than the three terminal ones, the two sets being among themselves almost equal. Clypeus entirely punctated and very similar to that of *B. Andamanensis*, but the horn is a little shorter, the frontal carinæ include a slightly smaller semilunar space, and the frontal processes of the clypeus are almost shorter, both pointed, nearly quite equal in size, and each is on the outer side accompanied by a short longitudinal carina, which, however, does not extend to the supra-ocular ridge.

Prothorax moderately convex, with a very faint trace of a median groove; lateral scar rather large, pitted all round, the dots or pits being almost continuous to the anterior corner and here again rather dense; along the lateral margins densely and very finely punctated.

Scutellum smooth. Shoulders moderately developed, on the anterior slope finely punctated and shortly hairy. Furrows of the elytra above distinctly punctated, laterally broader and with transverse bacilli, the seventh and eighth furrow are broadest.

Tongue rather narrow, punctated, thinly tricarinate, laterally concave. Lower lip convex, with sparse punctation, its branches densely punctated. Waist, below, with diverging elongated, dull scars. Metasternum smooth, its hinder corners coarsely punctated, and the narrow sloping sides along the elytræ very finely punctated and hairy.

Abdominal segments with elongated, finely punctated lateral scars, broadest on the first few segments, linear on the penultimate and obsolete on the last. Lower side of prothorax the middle and hind tibiæ with short and rather thinly distributed hairs.

*Hab.*—Sikkim. I obtained a single specimen at about 1500 feet, some two miles east of Pankabari.

The species is intermediate between *cancrus* and *Andamanensis*; with the latter it agrees in the shape and structure of the head, with the former in the transverse costulation of the lateral furrows of the elytra, but in *cancrus* this costulation is still stronger.

NOTE ON SOME ANDAMANESE AND NICOBARESE REPTILES, WITH THE DESCRIPTION OF THREE NEW SPECIES OF LIZARDS,—by DR. F. STOLICZKA.

[Received and read 7th May, 1873.]

I have given a list of the Reptiles and Amphibians, known from these islands, in a former paper,—Journal A. S. B., Vol. xxxix, pt. II, 1870, pp. 136-138 etc.; having, however, lately had an opportunity of visiting all the Nicobar islands (excluding Little Nicobar and Pulo Milu), and the Andamans, including the Cocos and Preparis, I am in a position to add a little information about some of the species. Our visit\* was chiefly from an ornithological point of view, and as it fell already in the hot season (March), the time was very unfavorable for collecting reptiles, at least on the northern group of islands, which at this season are much drier than the southern Nicobars.

We found the following species generally distributed over nearly all the islands which we visited:—*Tropidonotus quincunctiatus*, *Lycodon aulicus*, *Dendrophis pictus*,† *Cerberus rhynchops* and *Trimeresurus Cantoris*. Spe-

\* In company with Mr. A. O. Hume, C. B., Messrs. Ball and Wood-Mason.

† In the July number of the Berlin Monatsbericht (for 1872, p. 583), just received, I observe that Dr. Peters describes a *Dendrophis terrificus*, with 13 rows of scales; it is very closely allied to *Dendrophis caudolineatus*, (compare ante p. 123), but differs in coloration.

cimens of *D. pictus* from the Nicobars generally are as soberly coloured as the continental form, while those from the Andamans are very much brighter, but the typical form again occurs on the Cocos.\* The rare *Trimeresurus porphyraceus* was found to be common on the Preparis island; it grows to nearly four feet. Of lizards the most common were *Euprepes carinatus*, *Himulia maculata*, *Cyrtodactylus rubidus*, *Tiaris subcristata* and *Hydrosaurus salvator*. Of Batrachians *Bufo melanostictus* is very common.

*Euprepes macrotis*, described by Steindachner, was observed in Galtha Bay on Great Nicobar (Sambelong).

The large Andaman form of *Euprepes carinatus*† is not specifically distinct from the common type. I met with similarly large specimens (up to 20 inches) on the Coco islands. Most of those which I obtained there have thirty rows of scales round the body, and each scale has seven keels, the three median ones being strong and distant from each other, the two laterals on either side short, thin and sometimes scarcely traceable. Some specimens have the anterior frontal in contact with the rostral as well as with the vertical, a short process of the anterior frontal separating the two posterior. The specimens were apparently in breeding dress. The whole sides of the head, neck and belly were vermilion or bright cinnabar red, the anterior extremities and the back were also strongly tinged with red. The entire sides of the body and of the tail and the extremities had numerous large, irregular white and black spots intermixed, giving the lizard quite a different appearance from the ordinary type. The white spots were most numerous along the edges of the back, but there is no marked white band present.

#### PHELSUMA ANDAMANENSE, Blyth.

Comp. Stoliczka in J. A. S. B., 1870, Vol. xxxix, pt. II, p. 162, and Anderson in P. Z. S. Lond. for 1871, p. 160.

The following is a complete description of this remarkable lizard.

Body rather stout, moderately depressed, tail tapering, narrow at the base, with transverse contractions at distances. Snout almost conically elongated, rostral broader than high, just reaching the upper surface of the head; nostrils lateral, in the hinder edge of an enlarged, somewhat swollen shield, followed by a slightly smaller one; on the upper side the two nasals are separated by two (rarely by three) shields. Head, body and limbs, above and at the sides, covered with equal granular scales, or rather shields,

\* It is perhaps due to their more isolated situation that the Cocos and neighbouring islands, (Preparis, Narkondam, Barren island), have several Nicobar forms which on the Andamans are apparently wanting. We found *Carpophaga bicolor* common, *Calanus Nicobaricus* is said to have occurred on the Cocos, and *Megapodius* is found on Table island. Among shells I got numerous *Helicinae*, exactly like *H. Dunkeri*, *Bulinus Nicobaricus*, var., *Cyclophorus*, like *C. nicobaricus*, &c.

† J. A. S. B., vol. xxxix, Pt. II., p. 170.

becoming on the tail more depressed, scale-like, and intermixed with a few larger ones. Eye of moderate size, with an almost round pupil; it is surrounded with small granules. Ear-opening ovately rounded, equal to about one third of the longer diameter of the eye. Eight to ten low upper labials. Lower rostral large, somewhat produced and contracted behind. Nine to ten lower labials, the first two are largest, not in contact, the succeeding gradually decrease in size. None of the chinshields are particularly enlarged, and they vary in arrangement in different specimens. The scales of the belly are roundly hexagonal, across the middle in twenty-one to twenty-three longitudinal, alternating series.

The adult male has thirty-one femoral pores, in an uninterrupted series, angularly ascending in the centre. The female has a similar row of enlarged but not perforated shields. Præanal shields not enlarged. A small slit exists on either side in the postanal margin. On the tail the subcaudals become a short distance from the anus enlarged, single, only occasionally broken up into smaller shields. The inner toes on both the fore- and hind-limbs are very short, almost rudimentary; the fourth toe is longest, and all have their front edges rounded.

The general colour in males is grass- or bluish-green, subject to very great changes during the life of the lizard; head and neck with yellowish orange spots and stripes, among which one from behind the eye, one or two across the occiput, and one along the middle of the neck are most conspicuous. The anterior part of the body is on the upper side marked with small, oval, orange spots, on the posterior part these spots are somewhat larger, encircled with yellow, and sometimes partly confluent. All these orange spots often assume during life a strong reddish tint. Tail generally uniform bluish green. The lower side is uniform yellow or yellowish white.

The females are more soberly coloured, particularly when not full grown, in which case the orange spots are much less distinct, and sometimes almost obsolete.

The lower sides of the toes, especially towards their terminations, are silvery grey.

The usual size of full grown males is five inches, head and body being two; specimens of six inches are great rarities. The females are generally somewhat smaller than the males.

The species is not uncommon about Port Blair. I found a few on old trunks of trees (between epiphytes) on Mt. Harriet. They generally hide themselves under the bark of trees, but also often feed on the ground. Mr. Wood-Mason about a year ago brought a large number of specimens from the vicinity of Port Blair. I have not seen specimens from any of the other islands.



## GYMNODACTYLUS WICKSI, n. sp.

A small species, resembling in general character some of those described by Jerdon and Beddome from South India. The body is moderately slender and depressed, covered with very small, keeled tubercles which have the appearance of pointed granules; on the back there are numerous larger, but similarly formed, tubercles interspersed, and on the side of the belly these larger tubercles become distinctly spinulose; tail verticillate, with similar spinules, exactly as in *Hemidactylus frenatus*. On the snout the sharp granules are, as usually, somewhat larger than on the top of the head, but none are enlarged above the labials. The rostral reaches to the upper side of the snout, and is followed by two small shields, separated by a still smaller pentagonal azygos, the upper angle of which fits into a posterior emargination of the rostral. The nostril is lateral and directed somewhat backwards, it lies immediately behind the rostral, and is followed by two slightly enlarged and diverging shields, the anterior angles of which nearly touch the rostral, thus almost entirely isolating the nasal opening from the first labial and the shield behind the rostral. No particularly enlarged scales round the eye. Seven upper and lower labials, the first are in each case the longest, the succeeding gradually decrease in size, the last are very small; all are very low. Ear opening forms an oval, oblique slit, its distance from the eye is slightly less than that from the eye to the end of snout. Lower rostral large, obtusely pointed behind, followed on each side by a slightly enlarged shield, separated by smaller ones; there are no particularly enlarged chin-shields. The scales on the throat and anterior breast are finely keeled; those on the belly hexagonal and across the middle in about nineteen longitudinal series. Pre- or post-anals not enlarged. Sub-caudals along the middle line very little larger than the other shields covering the lower side. Reproduced portions of the tail are uniformly scaly, without enlarged tubercles.

The male has four pre-anal pores, situated between the femora in a shallow transverse depression, and quite separate from these are four or five femoral pores placed at the hinder lower edge of the femur, somewhat nearer to the hip than to the knee. Toes long and slender; basal portion with three or four transverse, squarish plates; the last the largest; terminal phalanges very much narrower.

*Colour.* Above, powdered brownish grey and white, a series of whitish, almost continuous spots along the middle of the back, extending on to the tail. There are six or seven of these spots from the nape to the base of the tail, and each of them is edged anteriorly and laterally with black, sometimes the lateral black edges develop into elongated spots and are most distinct. On the tail the white spots are less distinctly developed, but the transverse black margins well marked. The sides of the body, of the tail

and the upper side of the limbs is thinly checkered with black; the enlarged spinules and tubercles are all pure white. There is a dark streak between the snout and the eye, posteriorly there are three dark lines, one going to the occiput, the second to the ear, the third to the angle of the mouth; and generally there are one or two more below the eye, giving the side of the head quite an ornamental appearance. Labials spotted with white. Chin and throat powdered with brownish dusky, remainder of lower side uniform pale, more or less distinctly tinged with fleshy; in males more markedly so than in females. In the very young lizard (about one inch long) the lateral black spots along the back, and the median black line behind the eye are most distinctly marked, in other respects it does not differ from the adult.

*Hab.*—Preparis Island. I obtained five specimens, two apparently adult males and two females, and one young; all were found on the ground between old decaying vegetable matter. One of the largest specimens with perfect tail, measures: head and body 1.13, tail 1.37 = 2.5 inches. The length of the hind limb equals the distance from the shoulder to the groin.

I have great pleasure in connecting with this very interesting new species the name of the able Commander of the "Scotia," Capt. G. W. Wicks, who piloted us most skilfully through the labyrinth of small and large islands.

#### MOCOA MACROTYPANUM, n. sp.

Body moderately slender, head flattened above, muzzle rather attenuated and prolonged. Anterior frontal in contact with the rostral, separating the two elongated nasals, and posteriorly just touching the vertical, which is rather shortly, obtusely angular in front, and gradually attenuated behind. Four enlarged supraciliaries, preceded and followed by a smaller shield. The two anterior occipitals (? accidentally) united, the median one roundly angular in front, attenuated and contracted behind, the two laterals narrow, in contact with each other behind the median shield. Four pairs of scales behind the occipitals enlarged, occupying the whole width of the neck. Seven upper labials, the fifth under the orbit, six narrow lower labials. First chin-shield single, the second is a pair in contact, third separated by a small shield, fourth pair somewhat smaller. Lower eyelid with a transparent disk. Ear opening very large, rounded, with a perfectly smooth edge all round, the tympanum being distinctly visible. Body in the middle surrounded by twenty-two longitudinal series of smooth scales, six series being on the back; they are slightly larger than those at the sides. About fifty-two scales along the edge of the lower side, counted between the fore and hind limbs. A pair of moderately enlarged pre-anal shields. Median row of sub-caudals slightly enlarged. Limbs proportionately developed, with the toes very slender.

Head above brown, paler on the muzzle; three longitudinal white bands along the body,—one along the middle, originating between the eyes, and two along the sides, beginning on the supraciliary edges;—they are separated, above, by two somewhat broader brown bands, each being lighter coloured along the centre, and bounded at the sides by a similar brown band which is, however, darkest along the centre. The median dorsal white band becomes obsolete at the root of the tail, the two lateral ones continue on it, and unite when approaching the tip. Labials and sides of head brownish, spotted with white. Lower portion of the sides and the entire lower surface livid carneous, most distinctly so, and tinged with bright orange, on the lower belly and on the tail, which is also on the upper side carneous, with a few white dots at the side of the base, and irregularly marked with pale brown on the lower surface. Limbs, above, with very close longitudinal brown lines, toes all distinctly powdered with pure white.

Total length four inches, the head and body being 1·8, the length of the fore limb is equal to the distance between the shoulder and the angle of the mouth, or one-third of the distance between the axil and the groin; the length of the hind limb is one-half of the same distance.

*Hab.*—South Andaman. The single specimen was obtained on a sandy beach in Macpherson's Straits.

TIARIS HUMEI, n. sp.

A larger species than *T. subcristata*, and like this one with the crest interrupted above the shoulders, but the crest itself is very much more developed. The nuchal part is considerably higher than the dorsal one, on its convex edge it is composed of 13-15 lobes; the dorsal portion continues on to the tail, disappearing after about one-fourth of its length. None of the scales are at the lateral bases of the crest particularly enlarged. All scales on the body are distinctly and sharply keeled.

Head shelving and concave above; snout with a few enlarged scales along the centre; supraciliary edge sharp, its posterior end is separated by a short groove from a small tubercle following it. Two groups of enlarged conical scales on the upper side of the occiput; several (3-4) enlarged scales on the side of the head above the tympanum which is hardened near the centre, and about as large as the eye. Below the tympanum no scales are enlarged. Eight or nine upper labials and seven or eight lower labials; the scales adjoining the former are enlarged, and there is also a conspicuous row of slightly enlarged scales below the eye. A row of enlarged scales is separated from the lower labials by one of small scales. Scales on the side of the neck and body very small, arranged in somewhat irregular transverse series, with scattered larger ones intermixed; on the tail they gradually increase in size, but within a short distance of its base still have some

larger ones intermixed. On the limbs the scales are much larger, two or three on the upper side of the femora particularly so. Gular pouch and fold covered with small scales, which become larger on the lower belly than on its sides. The two rows of sub-caudals are slightly larger and more pointed than the shields on the upper side of the tail.

General coloration greenish olive, on the top of the head brownish; sides of the entire body more or less distinctly and rather densely reticulated and spotted with black and yellow; sides of head and neck and the gular sac tinged with purplish blue, labials spotted with blue. Chin mostly yellow; belly whitish, without spots. Tail brownish above, paler below, irregularly and indistinctly spotted with dusky.

Total length of one specimen 16 inches, of which head and body are 4·4 and the tail 11·6 inch. The fore limb when laid backwards extends beyond the groin, or almost to the præanal edge, and the hind limb when laid forwards fully reaches the anterior edge of the eye.

The above noticed characters readily separate the Nicobar species from *T. diophus*, or *T. tuberculatus*, lately (P. Z. S. 1872, p. 533, pl. xxxviii) described by Dr. Günther from the East Indian Archipelago.

I obtained only two specimens (male and female) on the Nicobar island Tillingchang, but the species did not seem to be rare.

#### DIBAMUS NICOBARICUS, (Fitz.).

*Rhinophidion nicobaricum*, Fitz., Steindachner, Novara Rept. p. 52 and *Typhloscinus nicobaricus*, ibidem, p. 94.

I have two specimens for examination, one a male\* and the other a female (known from dissection).

The male is six inches of which the tail is 0·9 inch; there are 24 longitudinal rows of scales round the body, and 48 transverse rows along the tail. The two extremities are on either side somewhat in front of the anus, towards which they converge; they are depressed, each lying in an oblique cavity, the intermediate space of the sacral region being flat, triangular and pointed above the anus. Each extremity is fully as long as the whole head,† it is covered on the upper side by three longitudinal rows of scales, narrowing towards the end which is occupied by a large, flat, nail-like scale.

The body of the female is somewhat stouter; it measures 5·5 inches, of which the tail is only 0·5 inch. The body is again surrounded by 24 longitudinal and the tail by 34 transverse rows of scales. On each side in front of the anus is an enlarged scale, separated by three small scales from the anal edge, and just in the place where the extremity in the male originates;

\* This is in the Indian Museum and I am indebted to Dr. Anderson for the opportunity of examining it.

† In *D. Nova-Guineæ* the extremity is only as long as the head is broad.

this large scale covers a small opening, in which internally a rather strong muscle terminates; the muscle is most probably emissible and retractile at the will of the animal.

All other characters are common to both sexes. The upper labial is separated from the rostral by a distinct groove. The shields are dark brown, almost blackish, with paler edges; paler below. The shields on the head are yellowish and there are occasionally yellowish spots on the chin and throat, or on the lower side of the tail.

As compared with *Typhloscincus Martensii*, Peters, the snout of the Nicobar species is narrower, the head posteriorly broader, the eyes, although covered by skin, distinctly traceable, all points to which Steindachner drew attention when comparing the two, but the shields of the head, the number of scales round the body and on the tail are in both species quite the same. There is in *T. Martensii* also an enlarged scale above the anal edge, but it is nearer to it than in the Nicobar species. Still, if it were not for Peters' distinct statement, that out of three specimens of *T. Martensii* two are males, and one a female, both without any trace of extremities, I should have considered the specific distinction of the *D. Nicobaricus* from *T. Martensii* somewhat doubtful. The coincidence is certainly remarkable.

*Dibamus* was characterized by Dumeril and Bibron (Érpet. gen. v. p. 833) from two New-Guinean specimens, sent to them by Prof. Schlegel. Both specimens were apparently males, but Schlegel\* says that these only possess a pair of posterior extremities, the females having none. And this is strictly in accordance with the observation made on the two Nicobar specimens.

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DESCRIPTIONS OF TWO NEW SPECIES OF INDIAN LANDSHELLS,  
by DR. F. STOLICZKA.

[Received 7th May, 1873.]

The following descriptions have been drawn up with the view of supplementing the figures of them which are to be given by Mr. Theobald in the 'Conchologia Indica.' The first species is from the Shan-states, and was collected, several years ago, by Mr. Fedden; and the second was given to me by Mr. Foote who obtained it in the cotton soil district near Bolgaom, when on his geological tour.

\* Comp. Berlin Akad. Monatsberichte for 1864, p. 271.

## PLECTOPYLIS SHANENSIS, n. sp.

*Pl. testa planorbulari, pallide fusca, apices minutissime exserto, pallido; anfractibus 6½, angustis, sutura indistincte marginata junctis, primis 2½ ad tribus minute rugulosis, cæteris transversim oblique striatis atque concentricè obsolete striolatis, ultimo ad peripheriam subrotundato, infrâ paululum angustiore, ad aperturam modice deflexo; umbilico spatioso, anfractus omnes suturâ distincte marginatâ separatos exhibente; apertura angulum circiter 55° attinentem cum axi formante, peristomate undique expansiusculo atque inorassato, margaritaceo lutescente, circumdata, ad utramque terminationem labii subangulati profunde incisa; labio plicis tribus distinctis instructo, plica mediana crassissima, ea atque infera multo tenuiore usque ad peristoma extensis, tertia interposita a margine remote evanescente, sed usque ad laminam internam verticalem, circiter tertiam partem unius circuitus a margine aperturali distantem, extensa; ultimo anfractu intus supra laminam verticalem antice plicis sex crassiusculis, postice plicis decem brevioribus atque tenuioribus instructo.*

*Diam. maj. 21·5, min. 17, alt. 6·5; diam. aut alt. aperturæ 7·5 m.m. Dimensiones speciminis secundi minoris sunt: 18·5, 15, 5·8, 6·6 m.m.*

*Hab.*—Provinciam Burmanam 'Shan-states' dictam.

This *Plectopylis* is readily distinguished from its allies by the presence of three labial plicæ, the strongest being in the middle and extending, like the lower thin one, to the edge of the lip, while the intermediate one disappears before it reaches the aperture, but it is the only one which extends to the internal almost vertical lamina. This last is superseded anteriorly by six stronger and posteriorly by ten thinner and shorter folds, but there is no corresponding lamina present on the inner side of the last whorl.

In external shape and character of volution the species is almost identical with *P. repercussa*, except that in this latter all the whorls are transversely striated on the upper side, and the last at the aperture a little more deflected, the umbilicus also appears to be a little wider, and not only the plicæ at the mouth but also the internal laminæ are totally different in *repercussa*; in this one there are two internal laminæ on the inner lip one behind the other, and one on the outer lip projecting in the space bounded by the two others.

## TRACHIA FOOTEI, n. sp.

*Trach. testa albida, orbiculata, supra deplanata, infra inflata, versus medium angustata, perspective modico umbricata, undique dense granulifera; anfractibus 4 ad 4·5, gradatim accrescentibus, primis duobus aut tribus conœxiuseculis, transversim striatis, cæteris magis deplanatis, transversim costulis inæqualibus et obliquis ornatæ, ultimo ad peripheriam valde carinato, costulis in carina evanescentibus, ad aperturam valde descendente atque fere*

*omnino deflexo; basi circa umbilicum rotundate subangulata, similiter costulata, costulis usque ad peripheriam extensis; apertura fere horizontaliter deflexa, transversim rotundate elliptica, margine dilatato fere undique libero, ad angulum umbilici angustissime adnato, circumdata. Diam. maj. 13·3, d. min. 11·2, altitudo totius testæ 6; altitudo apert. cum peristomate 5·5, ejusdem latitudo 6·8 m.m.*

*Hab.*—Belgaom, India occidentali.

The present species has to be placed in close proximity to *T. crassicostata*, and is as closely allied to it as this is to *T. fallaciosa*. It differs very markedly from *crassicostata* by its more distinctly orbicular and depressedly planorboid shape, by a well marked, smoother and thinner, peripheral keel on the last whorl, by a more inflated and towards the middle more contracted base, it being angular round the umbilicus, and by a considerably more deflected aperture.

In a former paper\* I expressed a doubt about *H. fallaciosa*, *ruginosa*, and *milghrica* belonging to the genus *Trachia*, as originally proposed by Albers. I observe, however, in well preserved specimens, that all of them possess the peculiar granular structure which is so characteristic of *Trachia*. *T. crassicostata* and *fbotei* must now be added to the list of these closely allied Western Indian species.

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ON RHOPALORHYNCHUS KRÖYERI, A NEW GENUS AND SPECIES OF PYCNOGONIDA,—by JAMES WOOD-MASON, of Queen's College, Oxford.

[Received and read May 7th, 1873.]

(With plate XIII.)

Much difference of opinion has prevailed with regard to the systematic position of the *Pycnogonida*, as to whether they should be classed with the Crustacea or with the Arachnida. By one set of naturalists, including Johnston, Milne-Edwards, Quatrefages, Kröyer, and Dana, they have been placed with the Crustacea; by another—including Latreille, Erichson, Gerstaecker and Huxley who separates them, as well as the Tardigrada and Pentastomida, from the typical Arachnida (Spiders, Mites and Ticks) as an aberrant order,—with the Arachnida. Dr. Anton Dohrn† who has recently studied the embryology of these animals finds that they are in no way related to the Arachnida, that they resemble the Crustacea in having a naupliiform first developmental stage, but that from this point the course of development ceases to exhibit anything in common with that of the Crustacea; under these circumstances I have thought it better to call the *cheli-*

\* Journ. A. S. B., Vol. XL, Part II, p. 224.

† Jenaische Zeitschrift, 1869.

*cera*, *palps*, and *accessory legs* (= mandibles, and 1st and 2nd pairs of maxillæ of Kröyer) of those who range the *Pycnogonida* with the *Arachnida*, *the first, second and third pairs of cephalic appendages* respectively, thus avoiding the use of terms implying affinities and homologies that may not in reality exist.

RHOPALORHYNCHUS,\* gen. nov. Wood-Mason.

Corpus lineare, gracillimum, annulis thoracis perdistinctis, cylindricis, utrimque dilatatis, processibusque lateralibus magnis, obconicis. *Rostrum* uniarticulatum, elongatissimum (corporis longitudinem pæne æquans), clavatum, ore triradiato. *Annulus oculiger* in collum vix coarctatus. *Appendices cephalicæ primi paris* absunt. *App. ceph. secundi paris* tenuissimæ, rostro longiores, novemarticulatæ, articulis secundo tertioque elongatis; *app. ceph. tertii paris* paulo longiores, ex decem confectæ articulis,—quorum tertius quintusque sunt elongatissimi, terminalesque quatuor prehensiles ac margine interiori serrati ciliatique—in utroque adsunt sexu; appendices utriusque paris, secundi ad tertium, tertii ad quartum articulum, sunt geniculatæ. *Tuberculus oculiger* in postica annuli parte est situs. *Pedes* gracillimi, inermes, equales, corpore (rostro incluso) duplo longiores, unguibus auxiliaribus armati sunt nullis. *Abdomen* uniarticulatum, obtuse-conicum, perbreve, vix distinguendum.

RHOPALORHYNCHUS KRÖYERI, n. sp.

Body linear, smooth. The rostrum is almost as long as the rest of the body, moveably articulated to the middle of the anterior end of the oculigerous somite, slender and filiform nearly to its middle whence it expands and finally narrows to its obtuse extremity; when examined in profile, the convex upper contour of the expanded portion is seen to carry two minute forwardly-directed spines, the one behind the other in the middle line. The mouth is situated at the extremity of the rostrum and has the form of a triradiate slit, the three slits being so disposed that a circle described from the point in which they meet so as to pass through their free extremities would be by them divided into three equal sectors. The ocular tubercle is erect, occupies the posterior half of the segment on which it is placed, and has the form of a short cylinder surmounted by a minute cone, the eyes being situated partly on the cylinder and partly on the cone at points corresponding, as usual, to the extremities of the arms of a St. Andrew's cross. A very distinct crescentic suture, bounding the base of the ocular tubercle posteriorly and curving forwards and outwards so that, if produced far enough, it would pass

\* ῥόπαλον, clava; ῥόγχος, rostrum.



out just in front of the first pair of legs, divides the oculigerous from the first thoracic somite.

The *cephalic appendages of the first pair* are absent. Those of the *second pair* are about  $1\frac{1}{2}$  times as long as the rostrum with which they lie in the same horizontal line, being articulated one on each side of it to the anterior end of the oculigerous somite, are filiform, excessively slender, and composed of nine joints. The first joint is subglobular, being nearly as broad as long, much broader than any of the succeeding joints; the second greatly elongated and slightly expanded at the apex; the third is very short and slightly curved; the fourth is greatly elongated, but not so much so as the second; the fifth is shorter than either of the four equal terminal joints which, together with the fifth and the distal half of the fourth, are fringed with short and very delicate cilia. Those of the *third pair* are also extremely slender, are articulated, a little posteriorly and internally to the second pair, to minute processes springing from the ventral arc of the oculigerous somite and meeting in the middle line. They are composed of ten joints, of which the first is minute, the two next equal and cylindrical, the third greatly elongated and just perceptibly expanded at the apical end; the fourth short, scarcely longer than the second of the two basal joints, and curved; the fifth is likewise greatly elongated, but more expanded at the apex and longer than the third; the four terminal joints are short, slightly decrease in length from the first to the last which comes suddenly to a subacute incurved point forming a sort of claw, are curved, fringed on their inner and concave margins with cilia and minute spinules, and capable of being coiled tightly together so as to form a prehensile organ.

Both pairs of appendages are elbowed at a short joint, intercalated between two long ones, *viz.*, the second pair between the 2nd and 4th, the third between the 3rd and 5th joints.

In many other species the terminal joints of the third pair of cephalic appendages (*pedes accessorii*) will probably be found to be similarly modified as a prehensile organ; an examination of O. F. Müller's faithful figures of *Nymphon grossipes*, Fabr. in the *Zoologica Danica*\* would, in fact, alone suffice to show the existence of such a modification in that species, even if Kröyer† had not described it in his diagnoses of the genera *Nymphon* and *Zetes*, without, however, offering any interpretation of the structure.

The *oculigerous somite* has its anterior margin straight, and is but faintly constricted in front of the eye-tubercle.

The *first thoracic somite*, if its distinctness from the oculigerous somite be admitted, is very short. Of the remaining somites, the second and third are subequal, the former being if anything the longer; are as perfectly cylindrical,

\* Op. cit., pl. cix, figs. 5 et 8.

† Naturhist. Tidssk., 1844, pp. 108 et 116.

and nearly as long as, but slightly stouter than, the filiform proximal moiety of the rostrum; and are suddenly expanded at their articular ends, each somite presenting the appearance of a cylinder with a greatly truncated cone affixed by its truncated surface to each end. The fourth and last somite is scarce half the length of those that precede it, and is similarly expanded at its anterior end only. From the sides of the expansions at the posterior extremity of the 2nd and 3rd spring two somewhat inflated outwardly-directed, obconic processes which might, at first sight, be mistaken for the first of the basal joints of the legs from their close similarity to these, but which are in reality one with the somite from which they arise: precisely similar processes carry the legs both of the first and of the last somite in which, however, they diverge like the arms of the letter Y. Wedged in between the roots of these processes of the last somite and the posterior boundary of its ventral arc, lies a minute, obtusely-conical tubercle with a large circular (anal) aperture at its extremity. This is the abdomen, a very evident, though rudimentary, structure in most *Pycnogonida* and even biarticulate in one species (in *Zetes hispidus*, Kröyer), but here so reduced in size as to be quite invisible from above, and only demonstrable with difficulty from below whence it appears, in ordinary positions, under the microscope as a convex, ovoidal or heart-shaped plate. It, moreover, looks downwards and slightly backwards, instead of upwards and backwards or directly backwards as it usually does.

The legs are long, slender, simple, equal in length, rather more than twice as long as the body including the rostrum, and are composed of eight joints, terminated by a weak, slightly curved claw. Their three basal joints are as broad as long, equal, and almost globular; the fourth is club-shaped at the distal end; the fifth is all but as long as the fourth and, with the remaining joints, perfectly filiform; the sixth is shorter and about twice the length of the two last together; these are subequal.

|                                                  |        |
|--------------------------------------------------|--------|
| Length of the body including the rostrum, .....  | 13 mm. |
| "    "    legs, .....                            | 26 mm. |
| "    "    2nd pair of cephalic appendages, ..... | 10 mm. |
| "    "    3rd " " " " " " .....                  | 12 mm. |

. From the linear form of the body and the slenderness of the legs, I conclude that my specimen is a male, a conclusion by no means invalidated by the presence of the third pair of cephalic appendages, which, being apparently invariably developed in both sexes throughout several genera, (*Nymphon*, etc.) consequently possesses no value in the determination of questions of sex.

*Hab.*—Dredged by the writer at Port Blair, Andaman Islands, in 25 fathoms of water, at which depth the bottom was clothed with a dense

tangle of delicate, filamentous algæ so closely resembling the animal in point of colour and form, that the latter was with difficulty distinguishable.

In conclusion, I dedicate the first species of *Pycnogonida* hitherto discovered in these seas to the memory of the illustrious Danish naturalist whose name is so indissolubly connected with the history both of the *Pycnogonida* and of the lower Crustacea.

### Explanation of Plate XIII.

- Fig. 1. *Rhopalorhynchus Krøyeri*, nat. size.  
 Fig. 2. The same greatly enlarged.  
 Fig. 3. A cephalic appendage of the second pair, greatly enlarged.  
 Fig. 4.       "       "       "       "       third       "       "       "  
 Fig. 5. Rostrum seen from the side .....       "       "  
           *a* = mouth.

ALGÆ\* COLLECTED BY MR. S. KURZ IN ARRACAN AND BRITISH BURMA,  
 DETERMINED AND SYSTEMATICALLY ARRANGED by DR. G. ZELLER,  
*High Councillor of Finance in Stuttgart.*

(Communicated by Mr. Kurz.)

[Received 3rd May; read 1th June, 1873.]

### DIATOMACEÆ.†

#### \*1. *PODOSIRA KURZII*, Z., n. sp.

Stipiti brevi cylindrico adnata; cellulis sphericis, v. oblongis et diametro paulo longioribus; 1/175 ad 1/150 lin. crassis; 2 et pluribus isthmo brevi concatenatis, lævibus, valvulis ad commissuræ margines nodulis binis minutis instructis. Arracan, Akyab, in rupibus marinis submersis (3280, 3283.)

### CHROOCOCCACEÆ.

#### \*2. *CHROOCOCCUS MINOR*, Ng. (*Protococcus minor*, Kg.).

Pegu, Elephant-point, in rhizophoretis ad corticem *Sonneratiæ apetala*. (3277).

\* The arrangement is according to Rabenhorst's *Flora Europæa Algarum*, that of the sea weeds according to Kutzing's *Species Algarum*. The numbers within brackets refer to Mr. Kurz's collections. Those species marked by an asterisk are new additions to Burmese phycology (see a paper on Burmese Algæ by the late Dr. G. von Martens, Journ. A. S. B., Vol. XL., 1872, p. 461 sq.)

† The diatoms from Burmah (about 60 or more species) are not yet distributed; Dr. L. Rabenhorst of Dresden has, however, been kind enough to undertake the determination of them. (S. Kurz.)

\*3. *CHROOCOCCUS INDICUS*, Z., n. sp.

Strato gelatinoso, tenui, pallide fusco; cellulis singulis solitariis, oblongis v. globosis, 1/700—1/300 lin. crassis, virescentibus; tegumento hyalino, vix conspicuo, cytiodermate achromatico, cytoplasmate granuloso. In stagno silvatico ditionis Prome (3151).

\*4. *CHROOCOCCUS GRANULOSUS*, Z., n. sp.

Strato gelatinoso, granuloso, aurantiaco; cellulis 4-12 et pluribus in familiis circiter 1/100 lin. crassis associatis, 1/500—1/300 lin. crassis, v. singulis ad 1/160 lin. crassis, globosis v. angulosis; tegumento tenerrimo, hyalino; cytiodermate hyalino, in cellulis junioribus vix conspicuo, in adultioribus cras-iusculo; cytoplasmate aureo-fusco, rarius viridi. Pegu, in valli alluviali fluminis Irrawaddi versus Thabymogon, in rivulo exsiccato (3223).

\*5. *APHANOCAPSA ALBIDA*, Z., n. sp.

Thallo tenui, membranaceo, amorpho, sordido albido; cellulis globosis, 1/700—1/600 lin. crassis, nunc solitariis, nunc seriatis aut accurvatis; tegumentis diffluentibus; cytoplasmate homogeneo, pallide aeruginoso. Arracan, Akyab, in stagnis salsis putrescentibus fluitans (3234).

\*6. *SYNECHOCOCCUS FUSCUS*, Z., n. sp.

Cellulis singulis, interdum duabus v. tribus longitudinaliter seriatis ellipticis, utraque fine rotundatis, 1/100 lin. longis, 1/250 lin. crassis; cytoplasmate fusco v. lutescente, homogeneo. Pegu, in montibus Yomah dictis secus rivulum Thit-Kouk (Pazwoondoung) in limo arenoso (3258).

*LEPTOTHRIXÆ.*\*7. *LEPTOTHRIX OCHRACEA*, Kg.

Pegu, in variis locis præsertim in montibus Yoma frequentissime e fissuris rupium humidarum protrudens et massas 1—1½ poll. crassas ochraceas formans. In collectione hæcce prostant stationes: Kadeng-choung ad Natmadhee (3232/a); Thayet-choung inter Kya-Eng (Eng = laculus) et Phounggyee, (3277); Wha-choung (choung = rivulus, fluvius, etc.) in stagno sylvatico (3237/a); Mui-how in montibus (Yomae meridionalis) in fonte (3240).

\*8. *HYPHEOTHRIX ÆRUGINEA*, Rabenh. (*Leptothrix*, Kg.).

Pegu, Phounggyee, ad ripas laculi in limo (3186/a) var. *subtorulosa*, Z. articulis ad genicula interdum parum contractis. Pegu, Kenbatee-choung in fonte ad vicum (3131).

\*9. *HYPHEOTHRIX CALCICOLA*, Ag. b. *muralis* (*Leptothrix muralis*, Kg.)

Pegu, Henzadah, ad muros ædis cujusdam vetustæ lateritiæ. (3167).

\*10. *HYPHEOTHRIX SUBTILISSIMA*, Rabenh. (*Leptothrix*, Kg.).

Pegu, in muris humidis muscosis cisternæ in vico Tharawa, in vicinitate oppidi Henzadah (3214/a, 3223/a, 3223/b).

\*11. *HYPHEOTHRIX VIRIDULA*, Z., n. sp.

Strato tenui, membranaceo, obscure ærugineo-viridi; filis parum curvatis, dense intricatis, ad 1/750 lin. crassis, apicem versus attenuatis, ærugineis, obsolete articulatis, interdum torulosis; articulis diametro parum v. ad duplum longioribus; vaginis delicatissimis, arctis. Pegu, in palude prope Wanet, in limo et in plantis aquaticis. (3238).

*OSCILLARIEÆ.*\*12. *OSCILLARIA ANTILLARUM*, Kg.

Arracan, Akyab, in stagnis subsalsis. (3216).

\*13. *OSCILLARIA ANTLIARIA*, Juerg. a *physodes*. Ibidem (3216).\*14. *OSCILLARIA BREVIS*, Kg.

Pegu, Kadeng-choung ad Natmadhee. (3134).

\*15. *OSCILLARIA CHALYBEA* Mert., var. *Indica*, Z.

Strato obscure chalybeo, filis tantummodo 1/400—1/375 lin. crassis. Pegu, in locis humidis limosis viæ inter Kyauzoo et Wachoung (3185).

\*16. *OSCILLARIA GRATELOUPII*, Bory.

Pegu, Elephant-point, in aquis dulcibus (3275).

\*17. *OSCILLARIA SANCTA*, Kg.

Pegu, Tharawa, non procul ab Henzada, in muris humidis cisternæ (3214/a, 3223).

\*18. *OSCILLARIA VIOLACEA*, Wallr. (*O. fenestralis*, Kg.)

Rangoon in limo aquæ dulcis. (3208).

\*19. *OSCILLARIA VIRIDULA*, Z., n. sp.

Strato membranaceo, viridi-ærugineo, longe radiante; filis læte ærugineis, rectis, 1/500—1/450 lin. crassis, apice ad dimidium attenuatis et leviter curvatis, subtilissime granulatis; articulis obsoletis, diametro duplo brevioribus. (*O. Neapolitanæ* proxima). Rangoon, in limo aquæ dulcis (3206).

\*20. *PHORMIDIUM ARENARIUM*, Rabenh. (*Ph. thinoderma*, Kg.).

Arracan, Akyab in limo aquæ subsalsæ (3220, 3286/a).

\*21. *PHORMIDIUM INUNDATUM*, Kg.

Pegu, Tharawa, prope Henzadah, in muris cisternæ (3223/b).

\*22. *CHTHONOBLASTUS LYNGBYEI*, Kg.

Arracan, Akyab, in rupibus marinis inundatis (3285).

\*23. *CHTHONOBLASTUS BURMANICUS*, Z., n. sp.

Filis 1/1500 lin. crassis, ærugineis v. lutescentibus, indistincte articulatis, parum flexuosis, apice attenuatis, in fasciculos pallide fuscis, 1/300 lin. crassos, flexuosos, contortis; vaginis ad 1/100 lin. crassis, pellucidis, fibrillosis, margine undulatis. Pegu, Tharawa prope Henzadah, in muris cisternæ (3214b).

\*24. *CHTHONOBLASTUS KURZII*, Z., n. sp.

Litoreus, strato nunc obscure chalybeo, nunc luteo-viridi, filamentoso; filis 1/400—1/300 lin. crassis, violascentibus, v. pallide ærugineis, numerosis, in fasciculos laxè contortis, apicibus attenuatis, obtusis; articulis plerumque obsoletis, diametro ad triplum brevioribus, rarius granulatis; vaginis 1/90—1/50 lin. crassis, sordidis, hyalinis, interdum transversim striatis. Pegu, Elephant-point, in rhizophoretis in limosis ad arborum radices et ad algas majores maritimas (3273, 3274).

\*25. *LYNGBYA PALLIDA*, Z., n. sp.

Pallide viridis, adnata, filis 2-4 pollicaribus, cespitosis, flexuosis, luteis v. virescentibus, cum vagina lævi, achromatica, 1/60 lin., sine vagina 1/70 lin. crassis; articulis diametro 3-5plo brevioribus, subtilissime granulatis. Pegu in montibus Yomah, Wathabwot-choung in saxis arenosis submersis (3175).

\*26. *HYDROCOLEUM MENECHINIANUM*, Kg.

Pegu, Elephant-point, in rhizophoretis, ad radices et arborum truncos submersos. (3263).

\*27. *HYDROCOLEUM STRIATUM*, Z., n. sp.

Rivulare, semipollicare, ærugineo-nigrum; vaginis 1/90 lin. crassis, transversim striatis, striis in 1/100 lin. 9; filis inclusis plerumque ternis, leviter contortis, 1/180 lin. crassis, dense granulatis, continuis, vel obsolete articulatis; diametro multo brevioribus. Pegu, in rivulo vadoso prope San-yæ-wa ditionis Rangoon (3200).

\*28. *SIROCOLEUM INDICUM*, Z., n. sp.

Cespitè parvulo, vix semiunciali, viridi; vaginis a basi 1/60 lin. crassa ad 1/250 lin. attenuatis, achromaticis; filis initio pulchre ærugineis, apice obtusis, obsolete articulatis, articulis diametro æqualibus, 1/750 lin. crassis, deinde pallidioribus et divisione longitudinali et transversali in gonidia 1/1500 lin. crassa, seriata, diametro 2-4plo longiora, collapsis. (*Sirocoleo*

*Gujanensi* affine, sed multo tenuius. Genus accuratius observandum). Arracan, Akyab, in rupibus maritimis inundatis (3280).

\*29. *SYMPLOCA KURZIANA*, Z., n. sp.

Lignicola, pollicaris et ultra, griseo-æruginea, fasciculis strictis, densis, basi coalitis: filis rectis, pallide ærugineis, subtiliter granulatis, continuis vix hinc inde obsolete articulatis, cum vagina 1/375 lin. crassis; vaginis achromaticis, arctis, superne sæpe vacuis. Pegu, in fundo naviculæ fluminis Myitnan ad Thabyægon (3222).

\*30. *SYMPLOCA LUTESCENS*, Z., n. sp.

Lignicola, semipollicaris, vix ultra, fasciculis basi viridi-ærugineis, apicem versus lutescentibus, dense cæspitosis; filis pallide ærugineis, apice evaginatiss, granulatis, sine vagina 1/450—1/300 lin. crassis; articulis obsolete; vaginis rigidis, achromaticis, ad 1/175 lin. crassis. Pegu, in planitie alluviali fluminis Irrawaddi, in fundo naviculæ, qua fluvium Lhein prope Beendau-Hseat transiit cl. Kurz (3160).

*NOSTOCHEÆ.*

\*31. *NOSTOC ELLIPSOSPORUM*, Rabenh. (*Hormosiphon*, Desmaz.) var. vaginis achromaticis.

Prome, in montibus Yomæ, inter muscos secus declivia rivuli Whay-dho (3178).

\*32. *NOSTOC GRANULARE*, Rabenh. (*Hormosiphon*, Kg.).

Pegu, Elephant-point, in aquis dulcibus stagnantibus (3291).

\*33. *NOSTOC PURPURASCENS*, Kg. (*N. rufescens*, Ag., forma purpurascens). Pegu, Kadeng-choung ad Natmadhee, natans (3230).

\*34. *NOSTOC RIVULARE*, Kg.

Pegu in montibus Yomæ, Koon-choung ad saxa arenosa humida (3176).

\*35. *NOSTOC HETEROTHEIX*, Z., n. sp.

Strato irregulariter expanso, olivaceo-viridi; filis leviter flexuosis, inæqualibus; alteris ærugineis, articulis globosis, 1/600—1/450 lin. crassis, cytiodermate vix conspicuo hyalino; alteris fuscis, cytiodermate evidenti, colorato, articulis globosis v. ellipticis, ad 1/175 lin. crassis; cellulis perdurantibus ellipticis, ceteris paulo majoribus. (Forsan *Hormosiphon heterothrix*, Kg.?) Pegu, in valli Pazwoondoung, in rivulo Bala-choung (3196); secus declivia limosa fluminis Irrawaddi ad Khyoung-gyee (3163).

\*36. *NOSTOC KURZIANUM*, Z., n. sp.

Terrestre, thallo fusco-atro, irregulariter expanso, membranaceo; filis densis, parum curvatis, fulvis; articulis 1/600—1/500 lin. crassis, sphaericis,

arctis, virescentibus; peridermate tenui, hyalino; cellulis perdurantibus globosis, ad 1/400 lin. crassis. Pegu, in montibus Yomæ centralis, Whathabwot-choung ad declivia limosa (4138).

\*38. *NOSTOC LIMOSUM*, Z., n. sp.

Terrestre, thallo olivaceo-fusco, tenui, indefinite expanso; filis brevibus rectis, dense implicatis, filis leptothrichoideis tenerrimis, articulatis, hyalinis intermixtis; articulis 1/500—1/300 lin. crassis, auctis, globosis v. ellipticis, arcte connexis, granulis viridibus fartis; peridermate hyalino, achromatico; cellulis perdurantibus sphaericis, duplo majoribus. Pegu, in planitie fluminis Irrawaddi, in limo ripario fluvii Lein inter Theo-choung et Beendau Hseat (3157).

\*39. *NOSTOC SAXATILE*, Z., n. sp.

Subglobosum, vetustate intus cavum, magnitudine cerasi, olivaceo-fuscum, aggregatum; peridermate fuscescente, filis non vaginatis, flexuosis; articulis ellipticis, pallide ærugineis, subtiliter granulatis, 1/600—1/500 lin. crassis; cellulis perdurantibus globosis, ad 1/375 lin. crassis. Pegu, in montibus Yomæ centralis, Kayong-mathay-choung in saxi arenosis humidis (3180).

### SPERMOSIREÆ.

\*40. *ANABÆNA BULLOSA*, Kg.

Pegu, in valli fluminis Sittang, in laculo prope Otweng, Tounghoo (3150); Pegu, in planitie fluvii Pazwoondoung, Bala-choung in limo (3211/6).

\*41. *ANABÆNA FLOS-AQUÆ*, Kg.

Pegu, in fluvio Lhein inter Beendau-Hseat et Theong-choung (3159).

\*42. *ANABÆNA STAGNALIS*, Kg.

Pegu, in fluvio Lhein prope Beendau-Eng (3161/6); Khyoung-gyee ad ripas fluminis Irrawaddi (3164).

\*43. *ANABÆNA SUBTILISSIMA*, Kg.

Rangoon, in limo canalium æstuariarum (3205).

\*44. *ANABÆNA INDICA*, Z., n. sp.

Strato tenui, expanso, obscure viridi, deinde fusco; filis rectiusculis, densis, subvaginatis, ærugineis, denique fuscis, apicem versus attenuatis; articulis tenuioribus 1/650 ad 1/600 lin. crassis, sphaericis, sæpe geminatis; crassioribus (sporangiis) ad 1/350 lin. crassis, sphaericis, v. ellipticis; cytoplasmate dilute ærugineo, granuloso. Arracan, Akyab, in limo aquæ subsalsæ (3213, 3218); Pegu, in montibus Yomæ, Yaitho-choung, in arena humida rivuli frequens (3234).



\*45. *CYLINDROSPERMUM HUMICOLA*, Kg.

Pegu, in limo ripario fluminis Irrawaddi ad Khyoung-gyee (3165).

\*46. *CYLINDROSPERMUM MACROSPORUM*, Kg.

Pegu, Kadeng-choung ad Natmadhee, natans (3230).

*RIVULARIÆ.*\*47. *GLAQOTRICHIA KURZIANA*, Z., n. sp.

Thallo globoso, lineam crasso, obscure olivaceo; filis ærugineis, brevibus, subulatis; articulis sæpe confluentibus, inferioribus ad 1/300 lin. crassis, diametro duplo brevioribus, superioribus eam æquantibus; vaginis ad 1/150 lin. crassis, achromaticis, sporis ærugineis v. lutescentibus, ovatis, basi ventricosiss, ad 1/180 lin. crassis, diametro 2-4plo longioribus, dense granulatis; cellulis perdurantibus sphaericis, 1/250 lin. crassis.—Arracan, Akyab in plantis aquæ dulcis (3212).

\*48. *RIVULARIA PEGUANA*, Z., n. sp.

Thallo gelatinoso, indefinite expanso, olivaceo, molli, hyalino; filis inclusis ærugineis, basi 1/300 superne 1/500 lin. crassis, apice plus minusve acuminatis, laxè intricatis, flexuosis, nunc distincte articulatis, articulis v. moniliformibus, diametro æqualibus v. duplo longioribus; nunc—præsertim in parte superiore,—continuis; cellulis basilaribus globosis, 1/300—1/175 lin. crassis, denique in sporangia fusca permutatis.—Pegu, Kadeng-choung ad Natmadhee in truncis vetustis submersis (3228).

*MASTIGOTHRICHÆ.*\*49. *MASTIGOTHRIX ÆRUGINEA*, Kg.

Pegu, Yenay Eng, in planitie alluviali fluminis Irrawaddi, ramis emortuis insidens (3132).

\*50. *SCHIZOSIPHON PARIETINUS*, Næg.

Arracan, Akyab in parietibus Phari vetusti (3215).

*SCYTONEMACEÆ.*\*51. *SCYTONEMA AUREUM*, Menegh.

Pegu, in variis locis frequens, ad rupes et corticola.—Elephant-point (3276); inter Rangoon et San-yæ-wa (3352); in montibus Yomæ centralis, Kayeng-mathay-choung, ad saxa arenosa (3173).

\*52. *SCYTONEMA CINEREUM*, Menegh.

Pegu, in templis pagoda dictis vetustis fere undique; Kya Eng in templo vetusto (3199).

var. b. *Julianum*, Rabenh. (*Drilosiphon Julianus*, Kg.). Pegu, in montibus Yomæ centralis, Yay-gnâ-choung ad saxa arenosa (3236).

## \*53. SCYTONEMA GRACILE, Kg.

Pegu, in planitie fl. Irrawaddi, Palay Kweng in cisternæ muris (3224).

## \*54. SCYTONEMA TOMENTOSUM, Kg.

Supra Rangoon, corticola (3466).

## \*55. SCYTONEMA PEGUANUM, Martens.

Pegu, in valle Sittang (3189) ; Phoung-gyee (3118), in truncis arborum frequens.

## \*56. SCYTONEMA VARIUM, Kg.

Pegu, in montibus Yomæ, in valle Choung-menah (Khaboung) (3152) ; Wachoung (Pazwoondoung) (3241/0).

## \*57. SCYTONEMA VIEILLARDI, Mart.

Arracan, Akyab, in stagnis exsiccatis subsalsis (3287).

## \*58. SCYTONEMA FULVUM, Z., n. sp.

Strato obscure olivaceo ; filis curvatis,  $1/180$ — $1/120$  lin. cum vagina crassis, fulvis ; pseudoramulis sparsis, divaricatis, conformibus ; apicibus attenuatis, clausis, extremis hyalinis ; filis internis vix conspicuis, pallide virescentibus ; articulis obsoletis ; vaginis lævibus, arctis, aureo-fulvis.—Pegu, Rangoon in foliis calami (3467) ; Yoma in cortice arborum (3146).

## \*59. SCYTONEMA FUSCUM, Z., n. sp.

Strato pannoso, fusco-rubescens ; filis 2-3 lin. altis, subsimplicibus, gracilibus, elongatis, basi  $1/180$ — $1/120$  lin. cum vagina, superne  $1/200$  lin. cum vagina,  $1/300$ — $1/250$  lin. sine vagina crassis ; vaginis lævibus, saturate fuscis, apicem versus pallidioribus ; filis inclusis pallide virescentibus, obsolete articulatis, granulatis, articulis diametro æqualibus.—Pegu, in terra nuda et ad declivia argillosa, Sanyæ-wa prope Rangoon in oryzotis (3201) ; in montibus Yomæ in valle fluvii Choung-menah (3153) ; Wachoung, in via cava (3187).

## \*60. SCYTONEMA KURZIANUM, Z., n. sp.

Strato olivaceo ; cæspitulis vix lineam altis, compactis ; filis  $1/300$  lin. cum vagina  $1/450$  lin. sine vagina crassis, subsimplicibus, basi coalescentibus curvatis, internis articulatis, viridi-lutescentibus ; articulis sæpe obsoletis, diametro æqualibus ; vaginis achromaticis v. lutescentibus ; cellulis perdurantibus globosis.—Pegu, Yoma, in cortice arborum (3141/a).

## \*61. SCYTONEMA MURALE, Z., n. sp.

Strato compacto, spongioso, lineam crasso, sordide olivaceo, v. nigrescente ; filis intricatis, flexuosis, parce ramosis ; pseudoramulis conformibus, brevibus, cum vagina  $1/300$ — $1/200$  lin. crassis, luteis, apice cinereis, inter-

dum roseolis; filis internis  $1/350$ — $1/300$  lin. crassis, pallide viridibus, apice hyalinis, distincte articulatis; articulis diametro æqualibus, v. duplo brevioribus; vaginis subachrois, aretis; cellulis perdurantibus globosis.—Rangoon ad muros hospitii circuit-house dicti (3207, 3209).

\*62. *SCYTONEMA OLIVACEUM*, Z., n. sp.

Strato cespitoso, 2-3 lin. alto, olivaceo; filis leviter flexuosis, rigidis, cum vagina  $1/150$ — $1/115$  lin. crassis; internis  $1/180$  lin. crassis, cinereis, distincte articulatis; articulis lamellosis, v. granulosis et linea transversali dimidiatis, diametro parum, hinc inde  $2\frac{1}{2}$  plo brevioribus; pseudoramulis, divaricatis, sæpe geminis, non tenuioribus; vaginis fuscis, lævibus. Pegu, in montibus Yomæ centralis, Zamayee-choung, in fissuris humidis rupium arenosarum (3235).

\*63. *SCYTONEMA PARVULUM*, Z., n. sp.

Strato tenui, tomentoso, fuscescente; filis brevibus, subsimplicibus, attenuatis, basi  $1/375$  lin. superne  $1/500$  lin. cum vagina vix  $1/700$  lin. sine vagina crassis, a basi distincte articulatis; articulis diametro æqualibus, vel longioribus, superne confluentibus; vaginis fuscis, filis internis viridibus. Pegu, in saxis arenosis montium Yomæ australis (3156).

\*64. *SCYTONEMA (SYMPHYOSIPHON) RHIZOPHORÆ*, Z., n. sp.

Cespitulis obscure olivaceis (in siccatis cinereo-nigrescentibus), spongioso-hirtis, semilineam crassis; filis fasciculatis, flexuosis, fuscis, parce pseudoramosis, cum vagina  $1/300$ — $1/225$  lin. crassis, apicem versus attenuatis, internis pallide ærugineis; articulis diametro æqualibus, vel ad triplum brevioribus, sæpe obsoletis; vaginis aretis, basi et apice brevi, acuminato, hyalinis; cellulis perdurantibus oblongis. Pegu, Elephant-point, in rhizophoretis ad cortices arborum diversarum, imprimis *Sonneratiæ apetalæ* (3267).

\*65. *SCYTONEMA SUBCLAVATUM*, Z., n. sp.

Callicola; strato obscure olivaceo, filis fuscis, sæpe basi connatis, partim (junioribus?) sursum incrassatis,  $1/30$ — $1/20$  lin. longis, simplicibus, curvatis, ad  $1/180$  lin. crassis; partim elongatis, ramello uno alterove instructis,  $1/300$  lin. cum vagina crassis; filis internis virescentibus, nunc obsoletis, nunc distincte articulatis; articulis diametro æqualibus; vaginis aretis. (Forsan status *Scytonematis muralis*). Pegu, in domo vetusta lateritia oppidi Henzadah (3167, 3168, 3169).

\*66. *SCYTONEMA VIOLASCENS*, Z., n. sp.

Cespite erecto, 3-4 lin. alto, pallide violaceo; filis basi  $1/150$ — $1/100$  lin. cum vagina  $1/130$ — $1/110$  lin. sine vagina crassis, fasciculatis, parce ramosis; pseudoramulis interdum binis, adpressis, vel intricatis, elongatis, gracilibus, flagelliformibus, variegatis, violaceis, ærugineis et fusco-luteis, ad  $1/250$  lin.

attenuatis, apice pallidioribus vel hyalinis; articulis diametro ad duplo brevioribus, sæpe confluentibus; vaginis arctis, hirtis, hyalinis v. lutescentibus. Pegu, Yoma in valle Choungmenah (Khaboung) ad declivia argillosa (3154).

\*67. *POLYPOTHRIX BINATA*, Z., n. sp.

Lacustris, cæspitulis 2-3 lin. altis, ærugineo viridibus; filis pulchre ærugineis, primariis  $1/300$  lin. crassis, pseudoramulis divaricatis, elongatis,  $1/500$  lin. crassis; articulis inferioribus distinctis, sæpe dimidiatis, plerumque diametro duplo longioribus, rarius ei æqualibus v. brevioribus, subtorulosis, supremis confluentibus. (Articuli sæpe ad modum *Sirosiphonis* longitudinaliter bipartiti). Pegu, Kya Eng, in radicibus submersis (3195, 3203) Eng-ga-na (3242, 3248).

*SIROSIPHONIACEÆ.*

\*68. *SIROSIPHON PARASITICUS*, Z., n. sp.

Strato cespitoso, fusco; filis virescentibus,  $1/200$  lin. cum vagina  $1/300$  sine vagina crassis, curvatis, parce ramosis; ramis ascendentibus, homogeneis; articulis sæpe obsoletis, vel confluentibus, duplici serie ordinatis, granulosis, diametro brevioribus; vaginis arctis, luteis v. hyalinis. Pegu, Yoma, Choungmenah, in sylvis sempervirentibus ad folia arborum et fruticum (3292).

*PALMELLACEÆ.*

\*69. *PLEUROCOCCUS VULGARIS*, Menegh. (*Protococcus*, Kg.).

Rangoon, ad parietes hospitii circuit house dicti (3210).

*DESMIDIEÆ.\**

\*70. *CLOSTERIUM STRIOLATUM*, Ehrenb.

Pegu, Kya Eng, inter plantas submersas aquaticas.

\*71. *PLEUROTÆNIUM BACULUM*, De Bary (*Docidium*, Bréb.).

Pegu, in palude prope Wanet, natans (3238/a).

\*72. *PLEUROTÆNIUM TRABECULA*, Næg. (*Docidium Ehrenbergii*, Bréb.).

Pegu, Eng-ga-na prope Phounggyee (3242).

\*73. *EUASTRUM ANSATUM*, Ralfs.

Pegu, Eng-ga-na (3242).

\*74. *EUASTRUM AMPULLACEUM*, Ralfs.

Pegu, Kya Eng.

\* These are only stray Desmids found by DD. Zeller and Rabenhorst amongst the Algae. My collection of Burmese Desmids is in the hands of Mr. W. Archer of Dublin. (S. Kütz.)

## ZYGNEACEÆ.

## \*74. RHYNCHONEMA KURZII, Z., n. sp.

Articulis sterilibus fine replicatis, diametro (1/120—1/100 lin.) 6-8plo longioribus, sporiferis tumidis; sporis fuscis, ellipticis, diametro (1/40 lin.) 2-2½plo longioribus; fasciis spiralibus 2 laxis, torulosis, anfractibus 2. Pegu, Eng-ga-na (3242).

## \*75. SPIROGYRA ADNATA, Kg.

Pegu, Pazwoondoung, Balachoung (3247).

## \*76. SPIROGYRA CRASSA, Kg.

In lacu prope Rangoon (3251).

## \*77. SPIROGYRA DECIMINA, Kg.

Prome, Toung-naweng-choung (3155); Myoma, in rupibus fluminis Irrawaddi (3170); Pegu, Kenbatee in fonte scaturiente (3165/a); Pazwoondoung-choung ad Kyauzoo (3184). Alga vulgatissima Burmæ, præsertim in planitiebus alluvialibus.

Forma *crassior*, filis sterilibus ad 1/38 lin. crassis. Pegu, in montibus Yomæ centralis, Wathabwot-choung, in fluvio frequens (3174).

## \*78. SPIROGYRA IRREGULARIS, Næg.

Pegu, Yomah centralis, Wopyoo-choung (Khayengmathay-chg.) versus Ghalee Tay natans (3177); Rangoon in canalibus æstuariis subsalsis (3204).

## \*79. SPIROGYRA JUGALIS, Kg.

Pegu, Kya Eng (3198).

## \*80. SPIROGYRA LONGATA, Kg.

Prome, Khyee Thay in flumine Irrawaddi (3137); Arracan, Akyab (3211).

## \*81. SPIROGYRA MAJUSCULA, Kg.

Pegu, in palude quadam prope Thounggyee (3244).

## \*82. SPIROGYRA NITIDA, Kg.

Pegu, in palude inter Theanchoung et Oakkan (3161/a); Prome, Khyee-thay in flumine Irrawaddi (3137); Arracan, Akyab, in aqua dulci (3219).

## \*83. SPIROGYRA QUININA, Kg.

Arracan, Akyab in aqua subsalsa (3239).

var. *β*, inæqualis, Næg. Pegu, Beeling Kadeng-choung ad Kway ma-kheing (3232).

## \*84. SPIROGYRA TROPICA, Kg.

Arracan, Akyab, in aqua subsalsa (3239).

\*85. *ZYGNEMA STELLINUM*, Ag.

Pegu, Tonkyan in vicinitate rivuli Bala-choung (3289).

\*86. *ZYGNEMA VAUCHERII*, Ag.

Pegu, Kya Eng (3194).

\*87. *ZYGNEMA AMPLUM*, Z., n. sp.

Viride, siccatum obscure fuscum; articulis sterilibus diametro (1/60 lin.) ante divisionem 2-3plo longioribus, post eam æqualibus, v. sesquilon-gioribus; fructiferis non tumidis, zygosporis globosis, v. late ellipticis; filis in vagina 1/40 lin. crassa, tenui, continua, subtiliter granulosa, hyalina, in-clusis. Pegu, in laculo inter Phounggyee et Kyauzoo (3243).

\*88. *MESOCARPUS INTRICATUS*, Hass.

Pegu, in palude inter Tean-choung et Oakkan (3161).

\*89. *MESOCARPUS SCALARIS*, Hass.

Pegu, Eng-ga-na (3242); Yoma australis, infra pagum Karensium Mui-hau dictum in rivulo (3256).

\*90. *STAUBOSPERMUM FRAGILE*, Z., n. sp.

Filis luteolis, intricatis, fragilibus; cellulis diametro (1/140—1/100 lin.) 5-10plo longioribus, ad genicula contractis; zygosporis quadrangularibus, 1/100—1/80 lin. crassis; sporodermate lævi. Pegu, Rangoon in lacu (3252); Kadeng-choung ad Natmadhee (3223). In provincia Pegu, præcipue secus fl. Irrawaddi, vulgaris.

*VAUCHERIACEÆ.*\*91. *VAUCHERIA SESSILIS*, DC., a. *cespitosa*, Ag.

Pegu, Yoma centralis, Khayeng-mathay-choung (3172); var. b. *repens*, Hass. (forma terrestris); ibidem, in limo siccescente (3181).

*ULVACEÆ.*92. *ENTEOMORPHA COMPRESSA*, L., var. c. *complanata* (*E. complanata*, Kg.).

Pegu, Elephant-point in rhizophoretis (3278); Arracan, Akyab, in mari (3281, 3284).

\*93. *PHYCOSERIS BURMANICA*, Z., n. sp.

Viridis, in sicco sæpius pallide olivacea, radice minuta, disciformi; sti-pite tenerrimo, rotundato, brevi, mox in phycoma planum, rigidum, basi oblique cuneatum atque attenuatum, obovatum, rectum v. curvatum, 1-2 pollicare, margine in adultioribus crenulatum, transiente. Cellularum diameter 1/800 lin. Pegu, Elephant-point, in rhizophoretis ad radices.

*DIPLOSTROMIÆ*\*94. *DIPLOSTROMIUM TENUISSIMUM*, Kg

Pegu, Elephant-point, in rhizophoretis ad radices (3272).

*CONFERVACEÆ*\*95. *CONFERVA FUNKII*, Kg

Pegu, in palude prope Phounggyee (3214)

\*96. *CONFERVA RHYPOPHILA*, Kg

Pegu, in planitie fluminis Iriawaddi, Eng suay in truncis submersis. (3165/c)

\*97. *CONFERVA SUBSTACEA*, Kg

Ariacan, Akyab in aqua subsalsa (3288)

\*98. *CONFERVA BURMANICA*, Z, n spAlbo viscosus, rigida, intricata, articulis diametro (1/180—1/100 lin)  
2½ 5 plo longioribus Pegu, Yenty eng in planitie fl Iriawaddi, in plan-  
tis aquaticis (3165/b)\*99. *CONFERVA UMBRICOSA*, KgPegu, Yoma centralis, Khayeng mathay-choung, in stagnis natans  
(3171), lay lay-choung (Zamayce) in limo sicciscente (3179)\*100. *CONFERVA INÆQUALIS*, Rabenh (*Psychohormium*, Kg), forma,  
filis ad 1/120 lin crassis Rangoon in aqua vadosa lacus natans (3243)\*101. *RHIZOCLONIUM HOOKERI*, Kg

Pegu, Elephant point in limo marino (3260)

\*102. *RHIZOCLONIUM ARBOREUM*, Z, n spObscure viride, siccatum cinerascens, filis a basi apicem versus paulo  
attenuatis, hinc inde ad genicula intumescens, brevissime radicanibus et  
genuflexis, articulis diametro (1/35—1/25 lin) æqualibus, vel duplo lon-  
gioribus, cytodermate crasso Pegu, Elephant point, in rhizophoretis ad  
corticem arborum (*Sonneratia apetala*) frequentissime truncorum latus ad  
septentrionem vergens dense investiens (3261)103. *CLADOPHORA CALLICOMA*, Kg (*Cl glomerata*, forma III.  
Rabenh) Pegu, Kadeng-choung ad Natmadhee (3225)\*104. *CLADOPHORA JAVANICA*, Kg

Ibidem (3226)

\*105. *CLADOPHORA STREPENS*, Kg (*Cl fracta* o *strepens*, Kg).Pegu, Yoma centralis, Wopyoo, choung (Khayeng-mathay-chg) versus  
Ghalee Tay (3177)

106. *CLADOPHORA TRANQUEBARIENSIS*, Kg.

Pegu, Yoma centralis, Tay Tay-choung, natans (3188).

\*107. *CLADOPHORA CODIOLA*, Z., n. sp.

Cespitosa, viridis, sicca pallida, pygmæa, vix 2 lin. longa, subsimplex; filis 1/100—1/75 crassis, apice incrassatis, obtusis; ramellis raris, uni-articulatis; articulis diametro 8-20 plo et ultra longioribus, infimo perlongo; cytiodermate crasso, hyalino, lævi; cytioplasmate granulati. Pegu, Irrawaddi, Eng-suay in truncis submersis (3166).

108. *CLADOPHORA EXIGUA*, Z., n. sp.

Sordide viridis, cespitosa 1-2 lin. alto; filis inferne ramosis, rigidis; ramis paucis, divaricatis, elongatis; articulis primariis 1/100 ad 1/90 lin., mediis 1/160 lin., ramorum 1/350—1/250 lin. crassis, diametro 2-3plo longioribus, ad genicula constrictis; cytiodermate crassiusculo. Pegu, Balachoung, in conchis (*Paludina*). (3197).

\*109. *CLADOPHORA (ÆGAGROPILA) CONTORTA*, Z., n. sp.

Cespitosa, pallide viridis, filis e radice pulposa convenientibus, simplicibus, perraro ramellum uniarticulatum emittentibus, 2-4 poll. longis, in funiculos contortis, basi 1/80 lin., sursum ad 1/35 lin. apice 1/100 lin. crassis; articulis cylindricis, valde inæqualibus, diametro 2-12 plo longioribus. Pegu Tonghoo, in fundo naviculi in fluvio Sittang (3143).

110. *CLADOPHORA MINUTISSIMA*, Z. (ad interim).

Pallide viridis, filis in cortice truncorum radicanibus, dense aggregatis, semilineam vix superantibus, 1/250—1/150 lin. crassis, simplicibus, v. raro ramello unicellulari instructis, a basi apicem versus incrassatis; articulis diametro 1½-3plo longioribus; cytiodermate flaccido, hyalino, cytioplasmate lamelloso. (Forsan *Cladophoræ* cujusdam status juvenilis). Marina Elephant-point in truncis submersis (3264).

*ÆDOGONIACEÆ.*\*111. *ÆDOGONIUM APOPHYSATUM*, A. Br.

Pegu, Kya Eng (3195).

\*112. *ÆDOGONIUM BRAUNII*, Kg.

Pegu, Eng-suay non procul a flumine Irrawaddi infra Henzadah (3166/a); Kadeng-choung ad Natmadhæ (3229).

\*113. *ÆDOGONIUM GRACILE*, Kg.

Pegu, Eng-suay in truncis submersis (3165/d).

\*114. *ÆDOGONIUM LANDESBOROUGHII*, Kg.

Pegu, prope Tonkyan supra Rangoon (3248).

\*115. *ÆDOGONIUM ROTHII*, Bréb.

In lacu Rangoonensi fluitans (3258).



\*116. *ÆDOGONIUM SCUTATUM*, Kg.

Pegu, Kya Eng in radicibus (3195).

\*117. *ÆDOGONIUM TENELLUM*, Kg.

Pegu, in stagnis et fossis prope Tonkyan, vicum supra Rangoon (3248).

\*118. *ÆDOGONIUM VESICATUM*, Link.

Pegu, Eng-ga-na (3242); Yoma centralis, Zamayee-choung in saxis arenosis (3233).

var. g. fuscescens, Kg.

Pegu, Kya-eng in radicibus (3193).

\*119. *ÆDOGONIUM KURZII*, Z., n. sp.

Monœcum; cellula basilari biloba, articulo terminali obtuso, articulis diametro ( $1/45$ — $1/32$  lin.) 2-5 plo longioribus, sæpe medio dilatatis, v. cuneiformibus, passim uno fine transversim plicatis; ogoniis sparsis, raro seriatis, ellipticis, diametro ( $1/30$  lin.)  $1\frac{1}{2}$ -2 plo longioribus; oosporis fuscis, sphaericis, v. diametro paulum longioribus; antheridiis unicellularibus, lanceolatis, medio constrictis. Pegu, in palude prope Wanet (3255).

\*120. *BULBOCHETE INTERMEDIA*, De Bary.

Pegu, Kya Eng (3195, 3203).

\*121. *BULBOCHETE PEGUANA*, Z., n. sp.

Dense intricata, repetite ramosissima, ramis alternis vel oppositis, sensim attenuatis et setis longis, vix  $1/1500$  lin. crassis, terminatis; articulis fili primarii ad  $1/200$  lin. crassi 2-3 plo, ramorum  $1/300$ — $1/500$  lin. crassorum 5 plo et ultra longioribus; oosporis ignotis. Pegu, Yoma centralis, ad rupes calcareo-siliceas inter muscos in cacumine montis Kambala-toung, alt. 3200 ped. s. m. (3459).

*ULOTHRIXACEÆ.*\*122. *ULOTHRIX SUBTILIS*, Kg.

Pegu, Eng-ga-na (3242).

\*123. *SCHIZOGONIUM TENUISSIMUM*, Z., n. sp.

Pallide flavo-virens, filis simplicibus  $1/500$ — $1/375$  lin. crassis, passim ramellosis; cellulis diametro duplo longioribus, gonidiis oblongis. Martabania, in Chinchonæ plantationibus, 3500 ped. altitudinis, in rivulo Opo-choung, Shantounggyee (3142).

*CHROOLEPIDÆÆ.*\*124. *CHROOLEPUS FLAVUM*, Kg.

Yoma centralis, ad bambusarum culmos (3144).

var. filis tenuioribus, articulis longioribus, *Chr. flavi et elongati* intermedium. Yoma, ad arborum corticem frequens (3145).

\*125. *CHROOLEPUS LAGENIFERUM*, Hildebrand.

In lacu Rangoonensi, inter *Confervam inaequalem* in aqua vadosa natans (3243).

\*126. *CHROOLEPUS UMBRINUM*, Kg. (*Protococcus crustaceus*, Kg.). Pegu, Yoma, Yaitho-choung, corticola, frequens (3148).

\*127. *CHROOLEPUS BOTRYOIDES*, Z., n. sp.

Cespitose siccitate pallide luteo, villosa, 2-3 lin. alto; filis flaccidis, ad 1/100 lin. crassis, lœvibus; ramis subsecundis, divaricatis, attenuatis, apice 1/250 lin. crassis; articulis diametro  $1\frac{1}{2}$ -2 plo longioribus; spermatiis globosis, minutis, plerumque ad latera ramorum in cumulos botryomorphos aggregatis. Pegu, Yoma, in cortice arborum (3147).

128. *CHROOLEPUS CALAMICOLA*, Z., n. sp.

Cespitose intricato, viridi, (in sicco pallide lutescente); filis ramosis, ramis attenuatis, subsecundis, divaricatis; articulis infimis 1/120 lin. crassis, diametro sesquialongioribus; superioribus diametro (1/300 ad 1/180 lin.) 2-4 plo longioribus; spermatiis plerumque lateralibus, raro terminalibus, sessilibus, globosis v. ellipticis, 1/180 lin. crassis, solitariis, v. seriatis. Supra Rangoon, in silvis sempervirentibus in foliis Calami (3467).

\*129. *CHROOLEPUS ELONGATUM*, Z., n. sp.

Cespitosum, siccitate flavo-cinereum, filis rectis, rigidis, 1/150 lin. crassis, ramosis; ramis secundis, valde elongatis, acuminatis, 1/300—1/225 lin. crassis; articulis primariis diametro duplo, ramorum 4-6 plo longioribus; spermatiis ignotis. Pegu, Yoma, Yaitho-choung, in cortice arborum in sylvis sempervirentibus (3148).

\*130. *CHROOLEPUS FUSCO-ATRUM*, Z., n. sp.

Strato tenui, crustaceo, fusco-atro (in sicco); filis brevibus, rectis, v. parum curvatis, torulosis; ramis divaricatis; articulis fuscis, 1/400—1/300 lin. crassis, globosis, v. late ellipticis. Pegu, in valle Choungmenah (Kha-boung) non procul a Tonghoo, in sylvis sempervirentibus (3469).

\*131. *CHROOLEPUS KURZII*, Z., n. sp.

Semipollicare, viride, cespitosum, in fasciculos conicos dense implicatum, filis primariis ad 1/125 lin., ramorum ad 1/300 lin. crassis; articulis diametro 2-4 plo (rarius pluries) longioribus; ramis divaricatis, subsecundis; spermatiis lateralibus, creberrimis, seriatis, sessilibus v. breviter petiolatis, initio globosis, deinde crateriformibus, 1/250—1/60 lin. crassis. Pegu, Tonghoo, Choungmenah-choung in sylvis sempervirentibus ad folia fruticum (præcipue *Alseodeia*) (3149).

\*132. *CHROOLEPUS TENUE*, Z., n. sp.

Cespitulis exiguis, gregariis, aurantiacis, siccatis cinereis; filis primariis 1/375—1/300 lin. crassis, varie flexuosis; ramis divaricatis, interdum recurvis, 1/500—1/400 lin. crassis; articulis diametro æqualibus, vel ad duplum longioribus, torulosis; spermatiis globosis, terminalibus et lateralibus. *Chr. abietino* proximum, sed articulis omnibus plus minus inflatis, brevioribus et tenuioribus distinguendum. Pegu, Elephant-point, in rhizophoretis ad corticem *Sonneratiæ apetalæ* frequens (3268).

*CHÆTOPHORACEÆ.*\*133. *STIGEOCLONIUM TENUE*, H., *γ. gracile*, Kg.

Pegu, Beendau Eng in caulibus Polygoni (3141).

\*134. *STIGEOCLONIUM RANGOONICUM* Z., n. sp.

Cespitè vix 1½ lin. alto. dilute viridi, vel lutescente, dense implicato; filis primariis 1/375—1/250 lin. crassis; ramis subdichotome secundis, ad 1/900 lin. crassitiem attenuatis, flaccidis; articulis valde inæqualibus, diametrum æquantibus torulosis, ad genicula leviter constrictis, vel cylindricis et ea 2-6plo longioribus. In cisterna quadam oppidi Rangoon (3249).

\*135. *CHÆTOPHORA PISTIFORMIS*, Ag.

Pegu, Phounggyee in laculo ad radices submersas (3190); Prome. Myitmakha-choung ad Gho-tau, in plantis aquaticis (3140).

\*136. *CHÆTOPHORA RADIANs*, Kg.

Pegu, Kya Eng in radicibus (3193).

\*137. *CHÆTOPHORA TUBERCULOSA*, Kg.

Pegu, in laculo inter Phounggyee et Kyauzoo (3245).

\*138. *CHÆTOPHORA STRICTA*, Z., n. sp.

Viridis, expansa, mollis, 1-2 lin. crassa; filis internis repetite et dichotome ramosis, strictis; ramis attenuatis, gracilibus, non piliferis; articulis oblongis, ad 1/350 lin. crassis, diametro 1½-3plo longioribus. Pegu, Kadeng-choung at Natmadhoe in ramis emortuis submersis (3231); Prome, Khyee-thay, ad silices rivuli tenui aqua fluentis in flumine Irrawaddi (3136).

\*139. *GONGROSIRA PYGMEA*, Kg.

Forma *tenuis*, non ultra 1/180 lin. crassa. Rangoon, ad rudera lateritia submersa (3250).

140. *GONGROSIRA ONUSTA*, Z., n. sp.

Flavo-viridis, cespitibus confluentibus, lineam crassis; filis e basi fibrosa continua articulatis; articulis diametro (1/150—1/100 lin.) 2—3plo longioribus; ramis numerosis, undique egredientibus, moniliformibus; articulis

ramorum omnibus oogonia globosa, ad  $1/125$  lin. crassa, formantibus; oosporis fuscis,  $1/250$  lin. crassis. Pegu, Elephant-point secus littora in truncis vetustis inundatis (3262).

#### CHANTRANSIÆ.

\*141. CHANTRANSIA ROSEOLA, Z., n. sp.

Cespitulis minutis, roseo-chalybeis; filis  $1/400$ — $1/300$  lin. crassis, fastigiatim ramosis; ramis distantibus, erectis; articulis diametro 4plo longioribus. Pegu, Beendau Eng, in caulibus Polygoni (3141).

#### BATRACHOSPERMACÆ.

142. BATRACHOSPERMUM MONILIFORME, Roth.

Pegu, in gurgite profundo paludis prope Phoungyee, ad radices arborum (3188).

#### HILDENBRANDTIACÆ.

\*143. HILDENBRANDTIA ARRACANA, Z., n. sp.

Incrustans, indeterminata, vage expansa, arctissime adnata, fusco-purpurea; cellulis  $1/700$ — $1/600$  lin. crassis, obsolete angulosis, rotundatis, absque ordine coacervatis. Arracan, Akyab in rupibus maritimis frequens, (3282).

#### CERAMIEÆ.

\*144. GONGRO CERAS RADICANS, Z., n. sp.

Capillare, repens, pollicare, apicibus rectis, vel parum curvatis, non forcipatis; filis intricatis, subpectinatis, vel repetite dichotomis, radican- tibus; radiculis numerosis e parti inferiori egredientibus, continuis, vel articu- latis; articulis cylindricis, diametro nunc  $1\frac{1}{2}$ -2plo longioribus, nunc ei æqualibus, supremis brevioribus; zonis superioribus confluentibus; tetracho- carpiis plerumque infra apices ramorum verticillatim dispositis, Pegu, Elephant-point in rhizophoretis ad radices truncosque arborum inundatos, (3274).

#### HALYMENTIÆ.

\*145. CATENELLA OPUNTIA, Grev.

Pegu, Elephant-point, frequens in rhizophoretis et secus littora in truncis vetustis inundatis, (3265).

#### GELIDIEÆ.

146. ACROCARPUS INTRICATUS, Kg. (*Gelidium*, Kg., *Sphaerococcus*, Ag.).

Arracan, Akyab in rupibus marinis, (3279)\*.

*POLYSIPHONIEÆ.*

\*147. *POLYSIPHONIA SUBADUNCA*, Kg., *major*, ramis crebrioribus, minus strictis.

Pegu, Elephant-point, in rhizophoretis frequens, (3274).

\*148. *BOSTRYCHIA INTRICATA*, Mont.

Pegu, Elephant-point, in rhizophoretis frequens, (3263).

\*149. *BOSTRYCHIA RIVULARIS*, Harv.

Pegu, Elephant-point, in rhizophoretis ad arborum radices, (3271).

*DELESSERIEÆ.*

\*150. *HYPOGLOSSUM BENGALENSE*, Mart.

Pegu, Elephant-point, in truncis vetustis inundatis ad littora satius frequens, (3266).

\*151. *HYPOGLOSSUM LEPRIEURII*, Kg.

Pegu, Elephant-point, in rhizophoretis frequens, (3270).

*APPENDIX.*

*CHARACEÆ BURMANICÆ*,\* determined by Dr. A. Braun, Professor of Botany in Berlin.

1. *NITELLA ROXBURGHII*, A. Br.

Pegu, Kya Eng, (3295).

2. *NITELLA MICROGLOCHIN*, A. Br. sp. v. subsp. nov. *N. oligospira* proxima.

Arracan, in valle Koladyne in stagno quodam silvatico.

3. *N. OLIGOSPIRA*, A. Br.

Pegu, Kya Eng, (3294).

4. *CHARA GYMNOPTIS*, A. Br.

Arracan, frequentissima in oryzetis inundatis vallis Kolodyne, (1964).

\* It may not, I think, be uninteresting to insert at this opportunity the few *Characeæ*, which have as yet been found in Burma. I am indebted to Prof. A. Braun who obligingly sent me the list a long time ago, for the names of the species. (S. Kurz.)

ON THE PTEROPIDÆ OF INDIA AND ITS ISLANDS, WITH DESCRIPTIONS OF NEW OR LITTLE KNOWN SPECIES,—by G. E. DOBSON, B. A., M. B., Staff Surgeon, H. M.'s British Forces.

(With Plate XIV.)

\*

[Read July 5th, received July 18th, 1873.]

Although Dr. W. Peters has done so much towards clearing up the synonymy of the *Pteropidæ* as well as of other families of Chiroptera, much yet remains to be done before a correct list of the species can be obtained.

The state of confusion into which the species of this family have fallen, in common with most species of Chiroptera, is mainly due to the great imperfection of the original descriptions, from many of which it is impossible to recognise the family to which the species belongs.\* This imperfection in description has arisen chiefly from the general ignorance respecting the Order which has prevailed amongst Zoologists, who seem to have shared the vulgar antipathy to these animals, if we may judge from the small amount of attention they have received, and also from the want of proper material in the Museums. Most of the *Pteropidæ* being large bats, and therefore unlikely to be preserved by collectors in spirit, have been described from dried specimens, and this also has added much to the imperfection of the description.

Much work, therefore, remains to be done both in obtaining well-preserved duplicates, in comparing them with the type specimens, and in producing from them descriptions from which it may be possible for naturalists in general to determine the species.

If the species of the genus *Pteropus*, as given by Drs. Peters and Gray,† be enumerated, there will be found to be not less than fifty.

The distribution of these fifty species is as follows :—

|                                                                                                  |    |
|--------------------------------------------------------------------------------------------------|----|
| Continent of India and Burma, .....                                                              | 1  |
| Malay Archipelago, .....                                                                         | 25 |
| China, Japan, and Loo-choo Islands, .....                                                        | 4  |
| Solomon Islands ; New Caledonia ; New Hebrides ; Fiji Islands ; Marianne and Viti Islands, ..... | 9  |
| Australia, .....                                                                                 | 5  |
| Africa and its Islands, .....                                                                    | 6  |

\* Thus Dr. J. E. Gray remarks (P. Z. S. Lond., 1866, p. 148)—“ The generic characters of *Aello*, as given by Dr. Leach, occupy nearly a page of a quarto book, and yet no one has been able to discover the genus. One could not have a more convincing proof that it is not mere length of character that is required to define a genus.”

† See Peters in Monatsb. Berlin Akad., 1867, p. 323, and Gray's Catalogue of Monkeys, Lemurs and Fruit-eating Bats, 1870.

It is very remarkable that, supposing the localities to be correct or approximately so, one half of the whole number of species is distributed among the small islands of the Malay Archipelago, while a single species—*Pteropus medius*—is the sole representative, hitherto discovered, of the genus in the Continent of India and Burma.

That a large proportion of the species should be found in the Malay Archipelago and adjoining Islands might be expected, as these animals like monkeys can live only where a constant supply of fruit is attainable throughout the whole year, but the same conditions obtain in the greater part of the Peninsula of India, and especially in Equatorial Africa, yet scarcely one-seventh of the whole number has been found in these regions.

The Malay Archipelago is, therefore, either the original and special home of the genus from which a few species have wandered into India and Africa, or many species remain undiscovered in the latter countries, and probably many of the so-called species which go to make up the large number from Malayana have been founded on insufficient grounds.

I have not the least doubt that the real number of species is much less than that recorded, and that many described as new by Temminck and others will, with the accession of additional and more perfectly preserved specimens to the collections hitherto available in our Museums, be found referable to a few really distinct species. This may be especially expected in the case of those species that have been founded on differences in the colour of the fur, which appears to have been regarded by some zoologists as of equal importance with the colour of the feathers in birds.

I have elsewhere\* dwelt at some length on the variability of the colour of the fur in many species of bats, and have shown that, in the *Pteropi* especially, individuals belonging to the same species present very different shades of colour according to sex age and season, and probably also, but in a less degree, according to locality.

Differences in the form of the skull and in the teeth have been also used to distinguish the species, but these, though of the greatest importance, are not satisfactory, if alone available as a means of diagnosis, for it should, surely, be possible to distinguish the species of a given vertebrate animal without first finding it necessary to kill and make a skeleton of it.

It is, therefore, desirable that, in the description of species, certain external characters may be given from which the living animal can be known, and these, I believe, may be found in the shape and relative size of the ears, and in the quality and distribution of the fur.

In all the Chiroptera, we find one or more of the organs of special sense greatly developed to supplement or, in some genera, almost wholly replace the visual organs (which in most cases are very rudimentary or, where

\* Proc. Zool. Soc. of London, 1878.

moderately developed, can be of little use owing to the nocturnal habits of the animals), and this development varies remarkably according to family, genus, and species.

Thus the peculiar form of the nose-leaf taken with the shape of the ears at once characterises the *Rhinolophidae*, and each species of the family may be distinguished by secondary modifications of these organs alone.

And in those families of bats where the nostrils are not furnished with appendages, the form and relative size of the ear will generally be found to be the most important characters for readily and accurately determining the species, and, next to and with these, the quality and distribution of the fur.

I shall employ this principle of diagnosis in the following descriptions of the species of Frugivorous Bats known to inhabit Continental India and Burma, and the Islands of the Bay of Bengal.

#### Genus I.—PTEROPUS, Brisson.

*Nostrils projecting; upper lip with a vertical groove in front bounded laterally by naked prominences; index finger with a distinct claw, metacarpal bone of second finger shorter than the index finger; wings from the sides of the hairy back; wing-membrane attached to the back of the first phalanx of the second toe; tail none.*

*Dentition* :—*in.*  $\frac{4}{4}$ ; *c.*  $\frac{1-1}{1-1}$ ; *pm.*  $\frac{2-2}{3-3}$ ; *m.*  $\frac{3-3}{3-3}$ .

*A.—Ears acutely pointed.*

#### PTEROPUS MEDIUS. Pl. XIV, Fig. 1.

*Pteropus medius*, Temminck, Monog. Mammal., I, p. 176.

„ *edwardsii*, (in part) Geoff., Ann. du Mus., vol. xv., p. 92.

„ *leucocephalus*, Hodgson, Journ. As. Soc. Beng., iv., p. 699.

„ *assamensis*, McClelland, Proc. Zool. Soc. Lond., vii., p. 148.

Ears long, with acutely pointed tips, the upper third of the outer margin concave beneath the tip; in fully grown individuals the longest diameter of the opening of the external ear, from the point of junction of the outer and inner margins below to the tip, measures one inch and a half.\*

Nostrils projecting, with a deep intervening emargination; upper lip with a narrow vertical groove in front bounded laterally by naked rounded prominences continuous with the integument of the nostrils.

\* The length of the ear (anteriorly) as given in the tables of measurements accompanying this paper (and also wherever mentioned in previous papers) has been determined by measuring the distance between the termination of the outer margin below and the tip. The breadth has been ascertained by means of a string passed round the ear posteriorly from the inner to the outer margin.



The ears are naked, except at the bases posteriorly, and a narrow triangular portion covered with short hairs terminating towards the middle of the outer margin; anteriorly, the anterior flattened edge of the inner side of the conch is covered from the base upwards for about one-third of the length of the ear.

The face is naked in front of a line joining the inner angles of the eyes, and on either side of the naked space (which corresponds to the position of the nasal bones) a few long fine hairs arise from separate papillæ. The fur is rather dense and moderately long on the back of the head, neck, and shoulders, but short and appressed on the back, narrowing to about two inches in width across the loins. A narrow line of short fur passes outwards on to the wing-membrane posterior to the humerus for rather more than half its length; the elbow is quite naked, but a few short hairs cover a narrow portion of the wing-membrane, about one inch and a half long, posterior to the forearm. The femur, and the interfemoral membrane as far as a line corresponding to the position of the semi-circular band on the under surface of the membrane are covered; the tibiæ are naked, or have only a few very short hairs; the feet are quite devoid of hair.

On the under surface, the whole body is well covered; the antibrachial membrane is similarly covered as far as a line drawn from the knee to a point about one inch posterior to the elbow joint, thence the hair passes outwards on the wing-membrane posterior to the forearm, terminating at about the beginning of the distal third of the radius. The thighs are covered, the legs and inter-femoral membrane are quite naked.

The nape of the neck and the shoulders are usually reddish yellow or golden yellow or pale straw colour, but every shade of these colours has been observed, the different colours and intermediate shades appearing to depend on sex, age, season, or locality. The darker shades are usually found in females.

The chest and upper part of the abdomen are either of the same colour as the nape of the neck or of a darker hue. The remainder of the fur black or dark brown often mixed with grayish hairs.

The fur of the neck is coarser and longer than that covering other parts of the body. In most male specimens a circular tuft of rigid unctuous hairs, of a deep reddish yellow colour, is found on each side of the neck, situated midway between the base of the ear and the origin of the ante-humeral portion of the wing-membrane from the shoulder. In a large male obtained near Calcutta, these tufts occupy a space one inch in diameter, and the hairs composing them measure about one-third of an inch in length.

*Hab.*—India generally, from Kachh to Burma, and from the Himalaya to Ceylon.

To this section of the genus belongs *Pt. edulis*, Péron et Lesaut, from

Java and Sumatra, which has been reported from Tenasserim,\* and may probably be found in the Nicobar Islands. This species, the largest of known bats, may be readily distinguished from *Pt. medius* by its ears, and by the distribution and quality of the fur. The ears are proportionately shorter and narrower than in the Indian species, and the concavity of the upper third of the outer margin is much less distinct. In a specimen from Java, in the Indian Museum, the ears are about the same length as in the most adult specimen of *Pt. medius*, while its forearm exceeds that of the latter species by more than two inches, and the tibia by an inch and a half. Compared with *Pt. medius* the light coloured portion of the fur extends further down upon the shoulders, and the breadth across the loins occupied by hair is proportionately much greater: this is well seen when specimens of equal size are compared, the breadth of the fur in this position in the not fully grown *Pt. edulis* being nearly, if not quite, double that in the adult *Pt. medius*. Elsewhere the distribution of the fur is similar in both species, but the hair on the wing-membranes and legs is conspicuously much longer in *Pt. edulis*.

*B.—Ears rounded at the tip.*

PTEROPUS NICOBARICUS. Pl. XIV, Fig. 2.

*Pteropus nicobaricus*, Fitzinger, Sitzungsber. Wien. Akad., 1860, p. 389, *nomen nudum*.

„ *melanotus*, Blyth, Cat. Mammal. Mus. As. Soc. Beng., 1863, p. 20, *nom. nudum*.

„ *nicobaricus*, Zeebeor, Reise der Oester. Freg. 'Novara,' Säugethiere, 1868, p. 11.

Ears rounded off at the tip, their breadth nearly equal to their length; the upper third of the outer margin slightly flattened, not concave, the lower two-thirds convex; in fully grown individuals the longest diameter of the opening of the external ear, from the point of junction of the outer and inner margins below to the tip, scarcely exceeds one inch.

The distribution of the fur of the body is similar to that of *Pt. medius*, but the hair on the wing-membrane is very much shorter.

In some male specimens the colour of the fur also corresponds very closely with that of *Pt. medius*; generally, however, the lighter coloured portions of fur on the nape of the neck, and on the shoulders and chest, are of a deeper hue than in the latter species, usually dark ferruginous red or chestnut; females and young males are commonly *intensely black throughout*; in some female specimens the position of the light-coloured tippet in the male is indicated by a reddish tinge.

\* A very badly preserved dried skin of an immature specimen of some species of *Pteropus*, in the Indian Museum, has been identified by Mr. Blyth with *Pt. edulis*, and the locality 'Tenasserim' recorded in his Catalogue. The specimen is in such a very bad condition I am able neither to confirm nor to correct Mr. Blyth's identification.

The skull differs from that of *Pt. medius* in being shorter, wider across the maxillary and nasal bones, and in having nearly all its processes and ridges much more strongly defined. The distance between the small anterior upper premolars exceeds\* that in *Pt. medius* by one-tenth of an inch. The *foramen ovale* is divided in the centre by a process of bone, in *Pt. medius* it is undivided. A post-orbital process of the zygomatic arch is present, though not so well developed as in *Pt. medius*.

The mandible is shorter and its rami deeper than in *Pt. medius*; the coronoid process is more developed vertically, its posterior margin is nearly straight, not deeply concave, and its superior angle is narrowly, not broadly rounded off as in the latter species.

The teeth are stouter in *Pt. nicobaricus* but their general characters are the same in both species.\*

*Hab.*—Andaman and Nicobar Islands, probably Java also. An old dried specimen in the Indian Museum is labelled Java, but not numbered in Blyth's Catalogue.

Neither Fitzinger nor Blyth described this species, though they invented names for it. Zeebor's description occupies nearly two pages of a quarto book, and very careful measurements of the original specimen are given, yet, as his description is taken from a young individual and contains few really diagnostic characters, I was unable to feel certain that specimens obtained by me last year from the Andamans and Nicobars should be referred to this species. But Dr. Peters has lately, at my request, very kindly compared some specimens sent to him from the Indian Museum with the type specimens of *Pt. nicobaricus* in the Vienna Museum. He informs me that they agree in the form of the ear and feet. With this additional information I feel no hesitation in referring the specimen from which the above description is taken, to that species.

|                                           | Pteropus medius. |      |      |      |      | Pteropus nicobaricus. |      |      |      |      | Pt.<br>scudalis. |
|-------------------------------------------|------------------|------|------|------|------|-----------------------|------|------|------|------|------------------|
|                                           | ♂                |      |      |      |      | ♀                     |      |      |      |      | ♂                |
| Length, head and body, .....              | 9.0              | 7.5  | 9.0  | 10.5 | 10.5 | 8.8                   | 8.0  | 9.8  | 9.0  | 12.0 |                  |
| " head, .....                             | 3.1              | 3.15 | 2.75 | 3.0  | 3.0  | 3.0                   | 3.0  |      | 2.8  | 3.5  |                  |
| " ear (anteriorly), .....                 | 1.5              | 1.40 | 1.45 | 1.5  | 1.45 | 1.05                  | 1.04 | 1.1  | 1.05 | 1.5  |                  |
| Breadth, ear, .....                       | 0.85             |      | 0.8  | 0.8  | 0.8  | 0.8                   | 0.8  | 0.8  | 0.8  | 0.75 |                  |
| Length, from ear to tip of nostril, ..... | 2.7              |      | 2.4  | 2.8  | 2.8  | 2.85                  | 2.45 | 2.5  | 2.3  | 2.55 | 2.8              |
| " from eye to tip of nostril, .....       | 1.3              |      | 1.1  | 1.15 | 1.2  | 1.15                  | 1.10 | 1.15 | 1.05 | 1.2  |                  |
| " forearm, .....                          | 6.0              |      | 6.0  | 6.2  | 6.3  | 6.5                   | 5.8  | 5.9  | 5.8  | 5.4  | 5.5              |
| " thumb, .....                            | 2.7              |      | 2.8  | 2.65 | 2.5  | 2.8                   | 2.5  | 2.6  | 2.6  | 2.35 | 3.0              |
| " second finger, .....                    | 12.5             |      | 11.5 | 11.8 | 11.9 | 12.5                  | 11.0 | 0.8  | 11.5 | 11.5 | 14.0             |
| " fourth finger, .....                    | 8.5              | 8.5  | 7.8  | 8.0  | 8.0  | 8.5                   | 7.4  | 7.8  | 7.8  | 8.0  | 10.5             |
| " tibia, .....                            | 3.0              |      | 2.7  | 2.8  | 2.8  | 3.0                   | 2.8  | 2.7  | 2.6  | 2.6  | 4.0              |
| " foot and claws, .....                   | 2.3              |      | 2.0  | 2.0  | 2.0  | 1.7                   | 2.0  | 2.0  | 2.0  | 2.4  |                  |
| " calcaneum, .....                        | 1.0              |      | 0.8  |      | 0.8  | 0.9                   | 0.85 | 0.85 | 0.75 | 1.0  |                  |

\* For the dentition of the genus *Pteropus* see De Blainville, *Oréographie*.

Genus II.—*CYNOPTERUS*,\* F. Cuvier.

*Nostrils projecting; upper lip with a vertical groove in front, bounded laterally by naked prominences; index finger with a distinct claw; metacarpal bone of second finger exceeding slightly in length the index finger; wings from the sides of the hairy back, wing-membrane attached to the base of the first toe; tail short, distinct.*

*Dentition*:—*in.*  $\frac{4}{4}$ ; *c.*  $\frac{1-1}{1-1}$ ; *pm.*  $\frac{2-2}{3-3}$ ; *m.*  $\frac{2-2}{2-2}$ .

*CYNOPTERUS MARGINATUS*. Pl. XIV, Fig. 4.

*Pteropus marginatus*, Geoffroy, Ann. du Mus. xiv, p. 97.

„ *pyrivorus*, Hodgson, Proc. Zool. Soc. Lond., 1836, p. 36.

*Cynopterus affinis*, Gray, Cat. Mammal., 1850, xix, p. 38.

*Eleutherura marginata*, Gray, Catalogue of Monkeys, Lemurs and Fruit-eating Bats, 1870, p. 118.†

Ears large, rounded at the tip, with a slight but distinct concavity of the outer margin immediately beneath the tip; both the outer and inner margins are bordered with white; the white border along the inner margin is about one-twelfth of an inch wide, and contrasts strongly with the dark brown colour of the ear; the outer margin terminates below without forming a lobe at the base.

Nostrils projecting, with a deep intervening emargination. The upper lip marked in the centre, as in *Pteropus*, with a narrow vertical groove bounded laterally by naked rounded prominences continuous with the integument of the nostrils.

The ears are naked posteriorly except at their bases; anteriorly, a few hairs appear on the conch along the outer side of the white border of the inner margin of the ear, and, similarly, along the inner side of the white border of the outer margin. On the upper surface, the fur of the back extends upon the wing-membrane nearly as far as a line joining the elbow and knee joints, also, thinly, upon the humerus, the femur, and proximal end of the tibia. Beneath, the antebrachial membrane is covered with moder-

\* I have placed the genus *Cynopterus* next *Pteropus* as I believe it presents more affinities with that genus than any of the other genera of *Pteropidae*. The species of these genera agree very closely in the form of the nostrils and of the narrow emargination on the upper lip bounded by naked prominences. In *Cynonycteris* this emargination is wide and deep with slanting sides, altogether very different from the same part in *Pteropus*. In habit also the species of *Cynopterus* and *Pteropus* perfectly agree; they are all strictly frugivorous bats and live in trees, while the species of *Cynonycteris* are commonly found in caves, and I have been informed that a colony of *C. amplexicaudata* living near the sea were seen to feed on Mollusca left exposed by the tide.

† For a complete list of synonyms of this species see Peters in Monatsb. Berlin Akad., 1867, p. 666, and 1869, p. 395.

ately long thinly spread hairs, and the wing-membrane is clothed to about the same extent as on the upper surface, the hairs also passing outwards in a narrow band posterior to the forearm. The colour of the fur is extremely variable, dark brown, reddish-brown, snuff-brown or olive-brown, sometimes with a bluish tinge throughout.

The first upper premolar is minute, and in the centre of the space between the canine and second premolar; the second premolar is about equal to the lower canine in vertical extent.

*CYNOPTERUS MARGINATUS*, var. *ANDAMANENSIS*. Pl. XIV, Fig. 5.

This is, I believe, a permanent variety of *C. marginatus*. It is readily distinguished by the small size of the ears which are similarly margined with white. The relative size is very well shown in the accompanying illustration.

Specimens of young individuals of *C. marginatus* from Bengal with forearm bones nearly half an inch shorter than specimens of adult animals of this variety from the Andamans have considerably larger ears.

*CYNOPTERUS SHERZERI*. Pl. XIV, Fig. 6.

*Pachysoma sherzeri*, Fitzinger, Sitzungs. Wien. Akad., 1860, p. 389, (nom. nudum).

*Cynopterus marginatus*, var. *Pachysoma Sherzeri*, Zelebor, Reise der Oester. Freg.

‘Novara,’ Säugethiere, p. 11, 1868.

This species, like *Pteropus nicobaricus*, was named but not described by Fitzinger, and Zelebor regards it as a variety only of *C. marginatus*. It is at once distinguished from that species by its small and narrow ears which are also *not* margined with white. When adult specimens of *C. marginatus* and of this species are compared together, the difference in the size and shape of the ears is very striking.

The muzzle is thicker, and the colour of the fur much darker than in any specimen of *C. marginatus*.

Zelebor mentions that the ears of the specimens obtained at Car-Nicobar are margined with white, but I have been unable to detect even the slightest trace of a white border in the ears of several specimens examined by me. Therefore, either Zelebor has been mistaken, or the white bordering of the ears is not a constant character in this species, or I have wrongly identified the species here described with *C. sherzeri*. But although it is quite impossible to identify the species here described with that obtained during the Novara Expedition at Car-Nicobar Island from Zelebor’s description (which consists merely of some unimportant remarks on the colours of the fur, wing-membrane, and eyes), yet as the animals which furnished the above description were taken not only at the same island—Car-Nicobar—but also from the same place on that island, namely, from the leaves of the cocoa-nut palms, I think it highly probable that they

belong to the same species, and, accordingly, to avoid the possibility of introducing a fresh synonym, I have retained Fitzinger's name.

CYNOPTERUS BRACHYSOMA. Pl. XIV, Fig. 7.

*Cynopterus brachysoma*, Dobson, Journ. A. S. B., 1871, p. 260.

I have little to add to my original description of this species.

The ears are much rounded off above, and the upper third of the outer margin is straight or slightly convex; the presence of a rounded lobe at the base of the outer margin at once distinguishes this species.

The difference in the measurements of the breadth of the ear given with the original description and in the table below is due to the measurement having been taken in the former case across the concavity of the ear, anteriorly; in the latter, by means of a string round the convexity, posteriorly.

Genus III.—CYNONYCTERIS, Peters.

*Nostrils projecting; upper lip with a wide groove in front with smooth not elevated margins; index finger with a distinct claw; metacarpal bone of second finger exceeding, or equalling, the index finger in length; wings from the sides of the hairy back; wing-membrane from the base of the second toe; tail short, distinct.* •

*Dentition*:—*in.*  $\frac{4}{1}$ ; *c.*  $\frac{1-1}{1-1}$ ; *pm.*  $\frac{2-2}{3-3}$ ; *m.*  $\frac{3-3}{3-3}$ .

CYNONYCTERIS AMPLEXICAUDATA. Pl. XIV, Fig. 8.

*Pteropus amplexicaudatus*, Geoff. Ann. du Mus., Vol. xv, p. 96.

„ *Leschenaultii*, Desmarest, Mammal., p. 110.

„ *amplexicaudatus*, Temm., I, p. 200.

„ *seminudus*, Kelaart, Journ. As. Soc. Beng., xxi, p. 345.

„ *Leschenaultii*, Blyth, Cat. Mammal. Mus. As. Soc. Beng., p. 21.

Head long, triangular; upper lip with a wide groove directly continuous with the emargination between the nostrils, the edges of the groove smooth, not thickened as in *Pteropus* or *Cynopterus*; ears moderate, triangular, rounded at the tip, the upper half of the outer margin straight, the lower half convex. •

Posteriorly the ears are naked except at their bases, anteriorly the conch is covered with a few very short fine hairs. The fur of the body extends upon the humerus and upon the fleshy part of the forearm, the remaining part to the carpus has only a few very fine hairs. The portion of the back and wing-membrane covered with fur across the loins is not more than an inch in breadth. The interfemoral membrane is densely covered with hair at the root of the tail, and on either side as far as lines drawn from the knee joints to the base of the free portion of the tail; the remaining portion, the legs and a considerable part of the wing-membrane beyond, are clothed with short, thinly-spread fur which extends along the wing membrane and legs

to the back of the feet. Beneath, the ante-humeral membrane is clothed with rather long thinly-spread fur, and the wing-membrane is similarly covered as far as a line drawn from the knee to a point about half an inch posterior to the elbow, whence the fur extends outwards to the carpus. The interfemoral membrane, the legs, and the feet are covered with a few very short hairs.

First upper premolar minute, equally distant from the canine and second premolar; second premolar exceeding lower canine in vertical extent; first lower premolar small, less than half the size of the second premolar; second premolar nearly equal to lower canine in vertical extent.

*Hab.*—From the Persian Gulf to the Philippine Islands. Bengal; Southern India; Ceylon; Burma; Celebes; Amboyna; Timor; Aru Islands.

CYNONYCTERIS MINOR, n. sp. Pl. XIV, Fig. 9.

Ears smaller and much narrower than in *C. amplexicaudata*; muzzle also proportionately shorter.

The minute first upper premolar is closely wedged in between the canine and second premolar; in *C. amplexicaudata* it is separated by a narrow interval from both these teeth.

The distribution of the fur is somewhat similar to that of *C. amplexicaudatus*, but it is much shorter on the wing-membrane and almost absent from the backs of the tibiae, from the adjoining portions of wing-membrane, and from the feet.

*Hab.*—Java.

|                                           |  | Cynopterus.         |            |           |                     |                          |        | Cynonycteris. |      |      |      |      |
|-------------------------------------------|--|---------------------|------------|-----------|---------------------|--------------------------|--------|---------------|------|------|------|------|
|                                           |  | C. mar-<br>ginatus. | C. andama- | C. sherz- | C. bra-<br>chysoma. | C. amplexi-<br>caudatus. | minor. |               |      |      |      |      |
|                                           |  | ♂                   | ♂          | ♀         | ♀                   | ♀                        | ♀      | ♂             | ♀    | ♀    | ♀    |      |
| Length, head and body, .....              |  | 4.4                 | 3.9        | 3.7       | 3.3                 | 3.4                      | 3.75   | 3.7           | 2.9  | 4.1  | 4.3  | 3.7  |
| " tail, .....                             |  | 0.4                 | 0.6        | 0.4       |                     |                          | 0.55   | 0.25          | 0.65 | 0.65 | 0.65 | 0.45 |
| " head, .....                             |  |                     |            | 1.4       |                     |                          | 1.3    | 1.25          | 1.7  | 1.7  | 1.7  | 1.55 |
| " ear (anteriorly), .....                 |  |                     |            | 0.7       | 0.7                 |                          | 0.63   | 0.6           | 0.8  | 0.8  | 0.8  | 0.68 |
| Breadth, ear, .....                       |  |                     |            | 0.4       |                     | 0.4                      | 0.3    | 0.32          | 0.4  | 0.55 | 0.55 | 0.35 |
| Length, from ear to tip of nostril, ..... |  |                     |            | 1.15      | 1.0                 | 1.15                     | 1.0    | 1.05          | 1.0  | 1.4  | 1.4  | 1.3  |
| " from eye to tip of nostril, .....       |  |                     |            | 0.5       | 0.48                | 0.48                     | 0.45   | 0.45          | 0.4  | 0.65 | 0.6  | 0.45 |
| " forearm, .....                          |  |                     |            | 2.6       | 2.6                 | 2.8                      | 2.7    | 2.7           | 2.2  | 3.2  | 3.15 | 2.8  |
| " thumb, .....                            |  |                     |            | 1.0       | 0.95                | 1.0                      |        | 1.0           | 0.9  | 1.25 | 1.0  | 0.9  |
| " second finger, .....                    |  |                     |            | 4.7       | 4.2                 | 4.7                      | 4.75   | 4.0           | 5.4  | 5.2  | 5.2  | 4.4  |
| " fourth finger, .....                    |  |                     |            | 3.3       | 3.1                 | 3.5                      |        | 3.5           | 3.0  | 3.7  | 3.9  | 3.3  |
| " tibia, .....                            |  |                     |            | 1.0       | 0.95                | 1.05                     | 1.0    | 1.0           | 0.8  | 1.35 | 1.4  | 1.05 |
| " foot and claws, .....                   |  | 0.7                 | 0.7        | 0.6       | 0.55                | 0.6                      | 0.6    | 0.6           | 0.5  | 1.0  | 0.85 | 0.75 |

## Genus IV.—EONYCTERIS, (nov.)

*Nostrils not projecting; upper lip with a shallow vertical groove in front; index finger without a claw; thumb short, part of terminal phalanx included in the wing-membrane; metacarpal bone of second finger equal to the index finger in length; wings from the sides of the hairy back; wing-membrane from the base of the first toe; tail short, distinct.*

*Dentition* :—*in.*  $\frac{4}{4}$ ; *c.*  $\frac{1-1}{1-1}$ ; *pm.*  $\frac{2-2}{3-3}$ ; *m.*  $\frac{3-3}{3-3}$ .

*First upper premolar minute.*

## EONYCTERIS SPELÆA. Pl. XIV, Fig. 10.

*Macroglossus spelæus*, Dobson, Journ. A. S. B., 1871, p. 261, pl. x, fig. 3, 4.

When first describing this species, I placed it in the genus *Macroglossus* on account of its very close resemblance to *M. minimus*, the type of that genus, in the form, number and arrangement of the teeth. Subsequently, however, in the MS. of a 'Catalogue of Chiroptera in the Indian Museum' I placed it in a separate subgenus '*Eonycteris*' on account of the very different attachment of the wing-membrane to the foot and sides. Lately, Dr. Peters writes to me that he is convinced, after a very careful examination of specimens sent to him from the Indian Museum, that the differences existing between this species and *M. minimus* are of generic importance, and require the formation of a new genus for its reception.

Since I described this species in 1871 I have come to regard the dentition of the Chiroptera as of less importance in their classification than many other characters. I believe that, although the teeth of *Macroglossus minimus* and *Eonycteris spelæa* correspond very closely, these species yet present many structural differences of more than subgeneric importance, and I agree with Dr. Peters that the latter species should be placed in a separate genus. I have, accordingly, raised my subgenus '*Eonycteris*' to the rank of a distinct genus of *Pteropidæ*.

## Genus V.—MACROGLOSSUS, F. Cuvier.

*Nostrils not projecting, upper lip not grooved in front; index finger with a distinct claw; thumb moderate; metacarpal bone of second finger equal to, or longer than, index finger; wings from the sides, their points of attachment separated by a considerable interval from the spine; wing-membrane from the base of the fourth toe; tail very short.*

*Dentition* :—*in.*  $\frac{4}{4}$ ; *c.*  $\frac{1-1}{1-1}$ ; *pm.*  $\frac{2-2}{3-3}$ ; *m.*  $\frac{3-3}{3-3}$ .



*First upper premolar nearly equal in size to the second.*

MACROGLOSSUS MINIMUS. Pl. XIV, Fig. 11.

*Pteropus minimus*, Geoff. Ann. du Mus., xv, p. 97.

*Macroglossus minimus*, Temminck, Monogr. de Mammal., I, p. 191.

*Pteropus rostratus*, Horsfield, Zool. Researches in Java.

This species is so well-known; and has been redescribed so carefully by Temminck, that no further description of it is here necessary.

It is found in abundance in the deep warm valleys about Darjiling. It extends from India through Burma to the Malay Archipelago.

DESCRIPTION OF A NEW SPECIES OF VESPERTILIO FROM THE NORTH-WESTERN HIMALAYA,—by G. E. DOBSON, B. A., M. B.

VESPERTILIO MURINOIDES, n. sp., Pl. XIV, Fig. 12.

This species is closely allied to *V. murinus* of Europe, from which, however, it is readily distinguished by the following characters:—

The general form of the ear is triangular, with narrow rounded tips: the inner margin is very faintly convex, almost straight, in its upper third, and the outer margin is concave beneath the tip, the remaining portion convex with a faint concavity opposite the base of the tragus.

In *V. murinus* the inner margin of the ear is strongly convex from the base to the tip, the concavity of the outer margin beneath the tip is very feeble, and there is a distinct emargination, almost angular, opposite the base of the tragus, succeeded by a well-developed terminal lobe; the general form of the ear is, moreover, oval, not triangular.

The tragus is slender and acutely pointed, with a quadrangular lobe at the base of its outer margin. In *V. murinus* the tragus is subacutely pointed, and the lobe at the base of the tragus is remarkably small.\*

The fur is dark brown above, with light brown tips; beneath, dark brown, almost black, with grayish tips.

The first upper premolar is very small, scarcely visible from without, and not much larger than the second. In *V. murinus* this tooth is distinctly visible from without and much larger than the second premolar.

The specimen (an adult female preserved in spirit) from which the above description is taken, was obtained at Chamba, at an elevation of about 3000 feet, by H. McLeod Hutchison, Esq., H. M.'s 14th Regiment.

\* The relative shape and size of the ears and tragi of *V. murinus* and *V. murinoides* are well shown in Pl. XIV, figs. 12, 13.

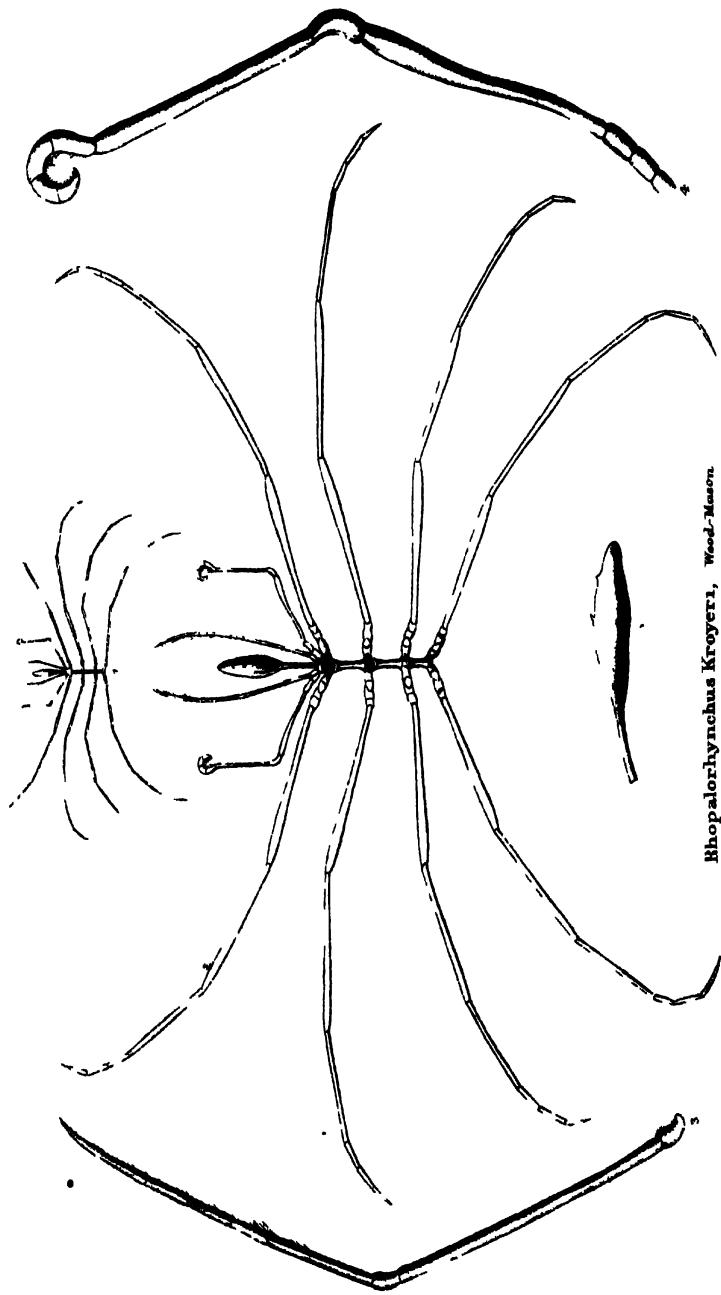
A dried specimen in the Indian Museum, labelled *V. murinus*, belongs also to this species. It is said in Blyth's Catalogue to have been sent from Masuri by Captain Hutton. The measurements of both specimens compared with those of *V. murinus*, L. from Europe are as follows:—

|                          | <i>V. murinoides.</i> |      | <i>V. murinus.</i> |      |
|--------------------------|-----------------------|------|--------------------|------|
|                          | ♂                     | ♀    | ♂                  | ♀    |
| Length, head and body, . | 2.7                   | 2.5  | 2.7                | 3.0  |
| "    tail,.....          | 2.1                   | 2.1  | 1.9                | 2.3  |
| "    head,.....          | 0.95                  | 0.9  | 1.05               | 1.1  |
| "    ear, (anteriorly),. | 0.8                   | 0.85 | 1.0                | 1.0  |
| Breadth, ditto,.....     |                       | 0.58 | 0.75               | 0.75 |
| Length, tragus,.....     |                       | 0.4  | 0.1                | 0.5  |
| Breadth, ditto,.....     |                       | 0.1  | 0.12               | 0.12 |
| Length, forearm,.....    |                       | 2.1  | 2.25               | 2.5  |
| "    thumb,.....         |                       | 0.4  | 0.5                | 0.5  |
| "    second finger, .... | 3.75                  | 3.4  | 3.3                | 4.3  |
| "    fourth ditto,.....  | 2.8                   | 2.8  | 2.65               | 3.3  |
| "    tibia,.....         | 0.9                   | 0.9  | 0.95               | 1.05 |
| "    calcaneum,.....     | 0.9                   | 0.9  | 0.7                | 0.9  |
| "    foot and claws, .   | 0.5                   | 0.5  | 0.5                | 0.6  |

The measurements given in the third column are those of a not fully grown specimen of *V. murinus*.

### *Explanation of Plate XIV.*

1. Ear of *Pteropus medius*.
2.   "      "      *nicobaricus*.
3.   "      "      *edulis*.
4.   "      *Cynopterus marginatus*.
5.   "      "      "      var. *andamanensis*
6.   "      "      *sherzeri*.
7.   "      "      *brachysoma*.
8.   "      *Cynonycteris amplexicaudata*.
9.   "      "      *minor*.\*
10.   "      *Eonycteris spelæa*.
11.   "      *Macroglossus minimus*.
12.   "      *Vespertilio murinoides*.
13.   "      "      *murinus*.
14.   "      *Murina cyclotis*.



*Rhopalorhynchus Kroyeri*, Wood-Mason





1. *Pteropus medius* 2. *Pt. nicobariensis* 3. *Pt. edulis*.
4. *Cynopterus marginatus* 5. *C. marginatus*, var. *andamanensis*.
6. *C. sherrzeri* 7. *C. brachysoma* 8. *Cynonycteris amplexicaudata*.
9. *C. minor* 10. *Eonycteris spelaea* 11. *Macroglossus minimus*.
12. *Vespertilio murina* 13. *V. murinus* 14. *Murina cyclotis*.



# JOURNAL OF THE ASIATIC SOCIETY

## Part II.—PHYSICAL SCIENCE.

### No. IV.—1873.

DESCRIPTIONS OF NEW SPECIES OF UNIONIDE.—By W. THEOBALD, Esq

[Received July 29th, 1873; read August 6th, 1873.]

(With plate XVII)

UNIO BHAMOLNSIS, n. s., Pl XVII, Fig. 1.

*Testâ subtriangulato-ovatâ, postico-acuminatâ, margine ventrali modice rotundato, umbonibus tumidiusculis, lævigatis, pustulis parvis aliquando armatis, decorticatis. Epidermide tenuissimâ, lævi, subpolitâ, læte viridi, in senioribus flavescente. Testâ concentricè subrugatâ, lineis paucis sive rugis angustis ligamentum versus plus minusve subradiatim notatâ, et antice rugis paucis perbrevibus leviter corrugatâ. Dentibus cardinalibus lamellatis, et denticulatis, in valvâ dextrâ singulo, multifisso, in sinistrâ gemino, posteriore triangulari et umbonem juxta posito, anteriore lamelliiformi, striato. Nacréâ argenteâ et iridescente.*

*Hab. prope Bhamo, regno Birmanico; necnon in Prome occidentali Provinciâ Pegu.*

*Lat. 52, alt. 40, crass. 26 mm.*

A rare species in Western Prome where alone I have met with it in Pegu, and remarkable for its smooth thin epidermis. The posterior slope alone is conspicuously ornamented with sculpture, but in my largest specimen from Bhamo and in some others also, the peculiar sculpturing of *U. burmanus*, W. Blfld. is faintly but distinctly perceptible over part of the valves towards the umbones especially. A small specimen of 36 mm. from Western Prome exhibits distinctly also the two rows of spines which characterise the next species, so that it seems that *U. burmanus*, *U. bhamoensis*



and *U. mandelayensis* constitute a natural little sub-group of osculant species at once distinct, but connected and sufficiently distinguishable from any of the ordinary Indian types. I have not, however, felt justified in separating them from the great Indian "*corrugatus*" group in my forthcoming catalogue of Indian shells.

UNIO MANDELAYENSIS, n. s., Pl. XVII, Fig. 2.

*Testâ cuneate subtriangulari, margine ligamentali recto, ventrali, rotundato; valde inæquilaterali: antice lævi, umbones versus leviter corrugatâ; postice ab umbonibus usque ad angulam posteriorem fortiter plicato-corrugatâ. Epidermide lævi, tenui, subpolitâ, glaucâ sive viridi-flavâ, lineis plurimis radiantibus obscure pictâ. Umbonibus decorticatis, granulosis, lineis duobus pallidis 5-6 muricate spinigeris, ornatis. Lineis ad marginem tendentibus, spinis vero vix ad medium valvæ attingentibus. Dentibus sicut in precedente.*

*Hab. prope Mandelay, regno Birmanico.*

*Lat. 53, alt. 40, crass. 31 mm.*

In only one specimen have I seen the muricate spines descend below the centre of the valves, but the pale linear bands whereon they stand usually descend to the margin.

The peculiar sculpturing of *U. burmanus* is also seen in this species though less strongly marked and though sometimes carried over a good portion of the valves, yet is usually most pronounced on the posterior slope.

UNIO FEDDENI, n. s., Pl. XV., Fig. 3.

*Testâ quadrato-ovali, concentrice sulcatâ, antice gibbose rotundatâ, postice dilatatâ, subtruncatâ; parum inæquilaterali. Umbonibus decorticatis, haud prominentibus. Epidermide lævi, subpolitâ, viridescenti-flavâ. Dentibus cardinalibus lamelliformibus, striatis; in valvâ dextrâ singulo, serrato, in sinistrâ geminis triangularibus, striatis et serratis. Nacrâ cærulescenti-albidâ.*

*Hab. in Peemunga fluvio, Indiæ centralis. Teste F. Fedden.*

*Lat. 40, alt. 29.5, crass. 19 mm.*

This very peculiar and marked form which somewhat recalls by its outline the American *U. securis*, seems a rare species and was collected sparingly among numbers of fine specimens of *U. wyngungensis*, Lea, in Central India by my colleague Mr. Fedden after whom I have named it. It falls naturally within the great "*corrugatus*" group, though there are few better marked varieties than it.

UNIO GOWHATTENSIS, n. s., Pl. XVII, Fig. 4.

*Testâ quadrato-ovatâ, antice rotundatâ, postice declive truncatâ, margine ventrali recto. Umbonibus decorticatis. Epidermide flavescente, postice*



*viridescens*. *Testâ concentricè striatâ et rugis plurimis minutis valde approximantibus angulariter seu fulgurate granuloso-crispatâ, postice tantum radiatim granuloso-crispatâ. Dentibus cardinalibus bifidis in utraq[ue] valvâ. Nacra cœrulescenti-albidâ, iridescente. In senioribus granulationes valde inconspicuæ sunt.*

*Hab. prope Gowhatti in Assam.\**

*Lat. 39, alt. 25.5, crass. 18 mm.*

The only other *Unio* that I am acquainted with possessing the peculiar fulgurate and granulose sculpture of this species is *U. crispisulcatus*, B., and to that group it must be referred, for greatly as the two species at first sight would seem to differ I have little doubt that intermediate forms connecting them will eventually be discovered. Fig. 4a represents the sculpture enlarged and fig. 4b that of *U. crispisulcatus*, B. for comparison.

MONOCONDYLIA ALLE, n. s., Pl. XVII, Fig. 5.

*Testâ oblongâ, solidiusculâ, antice rotundatâ, postice curvatim truncatâ. Margine ventrali recto; ligamentali convexo. Umbonibus decorticatis. Epidermide piccâ, in junioribus luto-flavescente lineis tenuibus obscure radiatim notatâ. Testâ incrementi lineis concentricè rugatâ, postice plicis paucis raro notatâ et valde evanescentibus. Dentibus minimis ut in *M. salweeniana*. Nacra cœrulescente, umbones versus flavescente.*

*Hab. prope Mandalay regno Birmanico.*

*Lat. 96, alt. 52, crass. 28 mm.*

This species differs considerably from the ordinary forms of *M. salweeniana* by its great smoothness and its elongated form. It resembles in the former respect the Philippine *M. Cumingi*, Lea, and young specimens sometimes exhibit a trace of faint sculpturing along the posterior slope much as in *M. inoscularis*, Gould, but all the adults I have seen have been quite devoid of sculpture.

SPILERIUM AVANUM, n. s., Pl. XVII, Fig. 6.

*Testâ quadrate rotundâ, tumidâ, antice rotundatâ, postice truncatâ, dilatâ, equilaterali. Epidermide, leviter et concentricè corrugatâ, postice levissime radiatâ. Umbonibus prominentibus, tumidis, osculantibus; colore pallide stramineo, tribus fasciis purpureis umbonalibus radiatim picto. Ligamento umbones versus inflato.*

*Hab. prope Ava.*

*Lat 75, alt. 66, crass. 5.2 mm.*

A single specimen of this rotund or pisiform species occurred among a number of specimens of *Corbicula* and other fresh-water shells received from Ava. •

\* Obtained by one of the collectors of the Indian Museum.—[Ed.]

ON THE MUDDY WATER OF THE HUGLI DURING THE RAINY SEASON WITH  
REFERENCE TO ITS PURIFICATION AND TO THE CALCUTTA WATER SUP-  
PLY.—By D. WALDIE, Esq.

(Received Oct. 29th ; read Nov. 5th, 1873.)

CONTENTS.

- I.—Introduction,—construction of the Filters at Palta, difficulties in their working—question as to the cause of this,—true cause, according to the author, is the peculiar nature of the water.
- II.—Desirableness of explaining the reason of this peculiarity,—considerations which led to its discovery,—its nature,—experimental evidence in proof.
- III.—Corroborative evidence from other sources, direct and indirect.
- IV.—Details of experiments connected with it and results.
- V.—Further corroborative evidence and additional explanatory remarks.

I.—The works for the supply of Calcutta with water have been in operation since the early part of 1870. The nature and arrangement of the filtering materials in the filtering tanks at Palta were decided upon chiefly from the results and conclusions to which I came after a series of experiments made during the rainy seasons of 1868 and 1869, for the purpose of ascertaining what was likely to be most suitable and efficacious for filtering the muddy water of the Hugli during the floods that extend from June to September or October annually. These experiments also included an examination of the value of a particular contrivance called Spencer's Regulating Cup, to which great importance was attached by the Engineer who designed the works. The general conclusions to which I came were, that this Regulating Cup possessed no *special* value, for that the retardation of the flow of water which was stated to be its particular function could be attained equally well or better by other means ; and that the better sand of the two kinds submitted to me for comparison was the fine sand from the sand-bank in the river, which, as it could be obtained on the spot, was called Palta sand. The other sand, called Magra sand from the locality at which it was found, was considerably coarser in grain, and was stated to be more like that used for filters in England. Though well enough aware of this, I decidedly preferred the Palta sand for filtering the muddy water of the rains, which was the period of special difficulty. For the remainder of the year, I considered it of little importance which kind of sand should be used.

In accordance with my recommendation, the filters were fitted up with Palta sand and without the regulating cups. They worked well during the first rainy season ; but afterwards, particularly during last season (1872), there was so much difficulty in getting water filtered through them sufficiently

clear, and in the required quantity, owing to the largely increased demand, that they were pronounced a failure by the Superintending-Engineer, who advocated a trial of the coarser sand combined with the Regulating Cup; with, as he said, assurance of success, and in the view of adapting this arrangement to the whole eight filters if found satisfactory.

No more complete condemnation of the arrangements I had recommended could well have been made. Reasons were given for it, of which I need only state the principal. The Palta sand was too fine, and consequently rapidly became choked up; such sand was not used in England. It was a principle laid down by Engineers that the muddy particles should not penetrate more than an inch or two below the surface of the sand; this was not the case here, as they penetrated deep into the sand, and made it foul throughout. The fine sand retarded the flow of water too much, and speedily became choked up by the deposition of mud; the proper retardation and regulation of the flow should be effected from below, either by a greater depth of coarser materials, or by the use of the Regulating Cup.

My replies to these reasons were that the fine sand was not too fine for the water which was to be filtered, and that if not used in England, neither was such water filtered in England. This mud of the Hugli water during the rainy season could not be prevented from penetrating deep into the sand, at least if the water were to pass at such rate as would be practically of use; that the choking up of the sand to a certain extent, instead of being an objection, was essential to its proper action as a filter for this water, and the object should be not to prevent but to regulate it,—and that it could be prevented neither by a greater thickness of coarse material nor by regulating cups. And, further, that the difficulty and consequent great amount of labour and trouble in filtering the water during the rainy season was caused, not by the particular arrangement or nature of the filtering materials but by the nature of the water itself; and, consequently, that the proposed remedy was entirely delusive, and would certainly fail.

Though no formal opposition, so far as I am aware, has ever been made to my statements or opinion respecting the quality of the water, neither has the conclusion been formally admitted as correct, and it has been overlooked or neglected in all reasoning on the subject, at least as a sufficient explanation of the difficulty. The principles of sand-filtration were appealed to, and these were explained to depend chiefly on the attractive power of the coarser particles of sand for the finer particles of the mud suspended in the water; and this was represented as the most important part of the process,—“such is, in fact, filtration,”—apparently almost to the exclusion of what was called mere straining. This explanation I hold to be totally erroneous. The most important part of the process is straining, the prevention of the passage of particles through narrow crevices between the grains of sand; next is depo-

sition by gravity, on the upper surface of these granules, of still finer particles;\* and last, and least important of all, is the mutual attraction of particles of mud and sand independent of gravity. The influence of all. of these processes will be affected by the greater or smaller size of the particles of mud in suspension, and the difficulty in getting the water to pass clear will be the greater the smaller the particles are. Hence the great difficulty with the water in question, the particles being so very fine.

II.—The peculiarity of the Hugli water from June to October I had always connected with the tropical rains and melting of the snows at the sources of the Ganges, occurring together so as to form one great flood of four or five months duration, instead of occasional floods to which rivers of European countries are subject, exceeding these greatly both in amount and in duration. I had not, however, been able to offer any other than conjectural explanations of its slowness in clearing by settling and of the difficulty in filtering it, of which I had found abundant evidence as a matter of fact. Attention having been again directed toward the subject by the circumstances previously referred to, I was led again to think of the advantage it would give me to be able to state some reason for my belief that the cause of difficulty lay in the nature of the water; some explanation of this peculiarity,—a reason why it should be so,—some generalisation shewing that it was not an isolated fact, but one of other similar facts admitted and acknowledged. Indeed, ever since it had been so forcibly brought under my own notice by my filtration experiments, and fixed in my own mind at least as a certainty, I had been alive to everything, old and new, that appeared to have a bearing on the subject, whether it were practicable means of purifying the water or a way of explaining the difficulty.

With respect to purifying muddy water generally there were certain methods which were well known and others less generally. The use of alum and other salts of alumina for such a purpose had long been known: salts of peroxide of iron, a substance chemically having much analogy with alumina, had more recently been introduced, and in my opinion they were even superior to salts of alumina. These substances act by the alumina or peroxide of iron being separated from its combination with the acid by alkaline matter which might be added along with them, or by the action of the carbonate of lime present in many waters, or even simply by large dilution, as in this case the base tends to separate from the acid. The alumina or oxide of iron separates in loose soft flakes which envelop or attract the fine particles of the mud, and carry them down with them, leaving the liquid quite clear. Indeed many other substances that produce flocculent precipitates by the addition of another substance have the same effect; thus by adding a solution of sulphate

\* Well illustrated by Wanklyn and Chapman in the 2nd edition of their treatise on Water Analysis.

of copper, and then a little soda, oxide of copper is thrown down carrying the mud with it. I have, indeed, made use of this method for precipitating the fine, suspended mud for chemical examination; the oxide of copper being removed from the precipitate, after collection, by ammonia and acetic acid, and the mud washed. This process, when the precipitants are employed in proper quantity, is speedy and convenient.

There is another class of substances which operate in a similar way, namely, alkalies and alkaline earths, such as Soda and Lime. These combine with the carbonic acid that keeps carbonate of lime in solution, which becoming insoluble is consequently precipitated. When Lime is used an additional quantity of carbonate of lime is produced. This, in fact, is Dr. Clark's well-known process for softening such waters as owe their hardness to carbonate of lime in solution. The precipitate formed carries down other matters with it leaving the water clear. The objection to the use of this process is the large quantity of additional sediment produced, and the risk of some prejudicial effect on the quality of the water, at least if not carefully managed.

Another class of substances the mode of action of which is not so evident, is acids. I do not know when this was first noticed. Graham, Miller, and Hofmann in their Report on the London waters, June 1851, speaking of the impurities, refer to "this clay tinge which resists the action of acids." Whether from this hint or not, I do not recollect, but I myself employed acids in 1866 for the purpose of clarifying the muddy waters of the Hugli during the rains.\* A small quantity of Nitric or Hydrochloric acid added to a large bottle of muddy water so altered and precipitated the mud that next day, or even in a few hours, it could be filtered clear with ease. I used alkalies, also, and perchloride of iron; but did not prosecute the subject further, my object having been simply to get the water clear with as little addition of foreign matter as possible; and nothing was better than a little of these acids,—even of acetic acid.

There is yet another class of substances the action of which is equally if not more difficult to explain, namely, those substances usually called neutral salts, both alkaline and earthy. The first direct notice I found of this was in some remarks in the 'Chemical News' of 3rd April, 1868, by Mr. W. Skey, Chemist to the Geological Survey of New Zealand, on the property of this class of substances to clarify muddy water. In this he specifies that 1 grain of common salt clarifies 5 ounces of muddy water and 1 grain of chloride of calcium or barium 10 ounces, 1 grain of lime 15 ounces and 1 grain of sulphuric acid 50 ounces. He thinks that these substances must act solely from their affinities for water, as it is not at all likely that they undergo any decomposition themselves. In the 'Chemical News' of 8th

\* Journ. As. Soc. Beng., 1867, Vol. XXXVI, Pt. II, p. 7.

July, 1870, is a short abstract from the 'Comptes Rendus' of the Academy of Sciences, of 20th June 1870, of a paper by Dr. C. Schloesing on the same subject, in which, it is stated, he refers to river waters contaminated with clay being readily clarified by 1000th part of chloride of calcium or other salts of lime, and being then readily filtered, while previously they rapidly choked the filter. He refers to several rivers, such as the Rhine in its lower course and the Durance which supplies Marseilles, as being notorious for this peculiarity. Then in the same Journal of 12th May, 1871, Mr. Skey notices this as a re-discovery on the part of Schloesing, and says that 1 grain of chloride of calcium is sufficient for 10 ounces of muddy water or 50,000 grains, an evident misprint for 5000 grains. He also notices a paper on the so-called molecular movements of microscopic particles by Professor Jevons, who has some theory about this coagulation of clay being due to the water becoming by such addition a conductor of electricity, and the clay particles charged with electricity.

Besides all these direct observations, there is a phenomenon which had long (long before these observations were made) come under the observation of chemists in filtering and washing certain precipitates and sediments, namely, that for a time, while there is saline matter present in solution, the filtered liquid comes clear, but when, by continuing to wash such substances by distilled water, these saline matters become much reduced in quantity, then the filtered liquid flows muddy, the solid substance passing in a state of very fine division through the pores of the filtering paper. The chemist to avoid this adds a proportion of some saline substance (such as chloride of ammonium or muriate of ammonia) which will not interfere with his subsequent proceedings, and so is enabled to wash the sediment or precipitate free from everything except the substance which he has added. He can get rid of this afterwards by other means if it be necessary. This peculiarity especially occurs with clays and substances more or less analogous to them, such as Zirconia and Titanic acid. Another illustration is given when we attempt to extract the saline matters soluble in water from clayey soils. When the soil is first mixed with distilled water and allowed to settle, the supernatant liquor may be clear: if this be poured off and more distilled water be mixed with the residue, it will not settle and clear so readily, and if the process be repeated, it may take a very long time to do so. Just in proportion as the saline matter is removed, the fine clay separates with greater difficulty from the pure water.

It is to be observed that the substances here referred to, namely, neutral salts, are just the same sort of matter that exists in natural waters in small quantity. Reflecting on the difficulty, with the impression of the above-mentioned facts on my mind, on or about the 1st August last, the question occurred to me: How small a quantity of such substances is sufficient

so to change the character of the mud in the river water of the rains as to enable it to settle with sufficient readiness, and in such a state as to render the water capable of being filtered without difficulty? Will the difference of quantity between that of the saline matter which exists in the water of the rainy season and that, say, of December be sufficient? Will the addition of such small quantity of the same kind of saline matter that exists in the river water to the water of the rainy season, so change its character that these difficulties in settling and filtering will be removed? Without delay a few experiments were instituted and their results observed, and these results shewed that the question was solved in the affirmative and the whole difficulty cleared up. The Hugli water during the rains contains too much pure water in proportion to its saline constituents, ~~on~~ these natural precipitants are present in too small quantity to precipitate the mud, as they do in other localities which have no tropical rainfall to produce so great dilution. And now my previous conviction as to the cause of the peculiarity was at once confirmed and explained.\*

The first experiment was made by means which came at once to hand. One quarter of a litre of muddy water from the river was mixed in a bottle with an equal volume of water from a tank which, in the dry season, I had found to contain a considerable quantity of saline constituents. Now, from the rains, I knew that it must be considerably more diluted, nevertheless not so diluted as the river water. In another bottle, for comparison, was mixed an equal quantity of the river water with the same volume of distilled water. It seemed natural to think that this mixture with distilled water would settle most speedily, more particularly as the tank water contained much glutinous vegetable matter; nevertheless, notwithstanding this disadvantage, the mixture with the tank water settled best. It was not a very good experiment, yet the result was quite distinct.

Then solutions of sodium and of calcium chloride (common salt and muriate of lime) were prepared of known strengths. The amount of saline constituents in the river water during the rainy season was pretty well known from former analyses, and these solutions were added in such quantity as approximately to double the quantity of saline constituents in the water, and thus bring it near the composition of the river water of December as regards alkaline and earthy salts. This produced an improvement in the settling, very slight in the case of common salt, very decided in that of chloride of calcium (muriate of lime). This at once shewed, what was afterwards abundantly confirmed, that lime salts were much more efficacious than alkaline salts. I shall return to this part of the subject further on.

\* At the meeting of the Society on 4th August last I intimated that I had discovered what I believed to be the true explanation of the difficulty with the water. *Vide Proceedings for August, 1873.*

Another obvious-looking plan was to dry a measured portion of the water and add its solid constituents to an equal quantity of water, so as to double the total amount. But there were practical difficulties in this process, in the changes the constituents would undergo by evaporation; it was, however, done thus: a portion of filtered water from the Calcutta hydrants was concentrated by evaporation over the water-bath to one-fifth of its volume; after this carbonic acid gas was passed through the concentrated liquor in order to redissolve the carbonates of lime and magnesia which had separated. One volume of this concentrated water was now mixed with four volumes of muddy river water, so as to make up the original quantity. This mixture, on being allowed to stand, settled well and the water could be filtered easily. In all cases a similar bottle of the muddy water, unmixed with anything, was placed beside these mixed waters for comparison.

In all the above experiments the waters were allowed to stand 24 or 48 hours to settle. This was a point I had calculated on, as the object was not to clarify the waters as rapidly as possible, but to imitate the settling and clearing of other natural waters or of the Hugli water itself during the dry season, by assimilating its composition so far as regards soluble salts to that of those.

III.—I have examined the tables given in Bischoff's *Chemical Geology*\* of the composition of various river waters for anything to be found bearing on this subject, and the author's remarks connected with rivers. The varieties of composition are obvious, and a few rivers are to be found containing but a small quantity of saline constituents and particularly of earthy salts in their waters. In a few cases the composition is given at different localities or at different periods of the year, but generally there is not enough of information to connect these facts with the subject under consideration. Two analyses of the Rhine water at Basle and at Strasburg shew fully 14 parts of Carbonate of Lime and Magnesia in 100,000: again at Bonn in March, 1852, there are fully 10 parts; in March, 1857, only  $4\frac{1}{2}$  parts; but in the former case the river was very low and of the usual clearness, in the latter it was much swollen and very turbid. Bischoff has a chapter on mechanical deposits from water, in which he notices various particulars respecting rivers. Of torrents which issue from glaciers, he says, all of them roll along in a turbid grey milky or dark stream according to the nature of the pulverized rock. Generally speaking, in rivers, the quantity of suspended matter increases with the height of the water, and the substances dissolved diminish. The suspended matter consists generally of clay, but in limestone districts it may consist partly or chiefly of carbonate of lime itself. Of course even water containing a considerable quantity of soluble salts of lime may be muddy, but if the mud consist of clay, the mud

\* Cavendish Society's Trans., 1854.



will settle readily by repose. If the suspended matter in such waters consist partly or chiefly of carbonate of lime, how it will be affected by the soluble salts present I am not prepared to say, as I have had no opportunity of examining such waters. A French author, whom I shall quote presently, speaks of waters which are never clarified entirely by repose; such are, as he calls them, "*les eaux blanches de Versailles*," which owe their milky tint to their contact with layers of calcareous marl. Whether these waters contain soluble salts of lime or not, I do not know.

In a note to the chapter referred to, Bischoff mentions that Th. Scheerer\* had found that "the deposition of suspended matter is hastened when certain salts—alum, sulphates of copper and iron—are dissolved in the water. But since a solution of chloride of sodium behaves like pure water, it cannot be expected that the suspended matter is deposited more quickly in the sea than in rivers." Now here is a mistake, for solution of chloride of sodium does not behave like pure water. Mr. Skey, more correctly, thinks that the transparency of the sea may depend on the precipitation of mud by the saline matter. Scheerer's observations must I think have been too hastily or imperfectly made.

The French works just referred to,† very valuable no doubt for what they were intended, principally engineering, did not, however, contain much of the sort of information I was in search of. That by Darcy gave me some worth noticing. It contains accounts of the filtering operations at Chelsea, Southwark, Thames Ditton, York, Hull, Paisley, Glasgow and Marseilles, also of the natural filters of Nottingham, Perth, Toulouse and Lyons. The natural filters are out of the range of the present enquiry, the first four appear to be on a similar plan to those at Palta, the latter three are different in their arrangements for cleaning the sand. Those of Gorbals, Glasgow, are not sufficiently well described, those of Paisley are; in both the clearing is effected by passing the water from below upwards, but, as the nature of the water is not at all likely to have any analogy with the water under consideration, I need not notice them. The filters at Marseilles, however, are worthy of a little attention. The water which supplies Marseilles is derived from the Durance. This water, as well as that of the Rhone, judging from the description, must have a considerable similarity to that of the Hugli during the rains, at least during certain periods, requiring a long time to settle and become clear. From some things stated in the account of the filtering operations, however, I do not think that the particles of the sus-

\* In Poggendorff's *Annalen*, Vol. 82, p. 419, date unknown but previous to 1854.

† *Traité de la conduite et la distribution des eaux*, par J. Dupuit, Paris, 1854 and *Les Fontaines publiques de la ville de Dijon* par Henry Darcy, Paris, 1856, both beautifully illustrated by plates. For inspection of these I have to thank Dr. Tonnerre, Health Officer to the Municipality.

pended mud can be so very fine as those of the water of the Hugli during the rainy season. There are unfortunately no analyses, but as they come from Alpine regions they must be often diluted with much pure water from melted snow.

The whole thickness of the bed of filtering materials is only .8 metre or about 2 feet 8 inches, of which the upper layer is .3 metre or about 12 inches, consisting of very fine sand (*Sable très fin de Montredon*), below which are layers of middling and coarse sand, gravel and broken stones. It is stated that the filters might work more than eight or ten days, but if kept going longer they would be more difficult to clean. This cleaning is effected by passing the water backwards and upwards through the sand, the impure water being carried off from the surface by channels for the purpose. I have to observe that here we have filter beds much thinner than those at Palta, very fine sand and upward charging, all points that have been considered objectionable for the Palta filters. The cleaning by upward charging requires considerable velocity of current and a continuance of it for four or five hours of time. I have calculated from the data given that it would require about 14 or 15 feet of perpendicular height of water, that is, about as much water as one of the filter tanks, emptied of its filtering materials, would hold two and a half times. No account is given as to how it is done, but I concluded that the level of the canal from which the water is supplied to the filters must be sufficiently high for the purpose.\*

I can also bring confirmatory evidence of another kind from English waters, evidence to shew why these waters are not attended with such difficulties in their filtration. There are no circumstances to produce such muddy waters as are to be found even on the European continent, no Alps and glaciers to produce this muddy water even at its source, no mountain snows to melt, and no large falls of rain concentrated in one period. I refer to a paper by Dr. Frankland† on the water supply of the Metropolis during the year 1865-66. In this paper there are several tables of the principal constituents of the water of nine Water Companies for every month of the year. These tables shew that the amount of saline constituents varies during the year, but never to near such an extent as that of the Hugli: they also shew that the earthy salts vary in their amount as indicated by the hardness, but never become reduced to nearly the same degree as those of the Hugli, being at their lowest indeed nearly as much in amount as those of the Hugli in December or January. The variation of course depends upon the rainfall, but this does not vary as respects either quantity or time in the same

\* I have since been informed by Dr. Tonnerre that the level of the canal is high above the town.

† Journ. Chemical Society, 1866, Vol. XIX, p. 239.

way as it does in the valley and the source of the Ganges ; in England the rainfall and hardness both rise and fall repeatedly during the year. The case is entirely different from the state of matters here in which we have a very soft water from the commencement of the regular rains gradually becoming harder in November and December and continuing so till the rains set in again in the following year. There is no reason, therefore, to expect any noticeable disturbance in the conditions of filtration in England from change in the condition or nature of the water, but every reason to expect it here, if we can only suppose or admit that such a change in the water may affect the filtration. And I would ask, why we should not admit that it should do so? My experience convinced me that it did so affect the filtration, and though I could not satisfactorily account for it or explain how it did so, I continued firmly to maintain that it did so, that this was the true cause of the difficulties, and that consequently other explanations were fallacious and baseless.

I should have been glad to have found other corroborative evidence of the correctness of my opinions, but had no means of obtaining it. Fortunately the discovery of the nature of the peculiarity rendered this of comparatively small importance. I return now to the consideration of this subject a little more in detail.

IV.—After ascertaining that such a very small quantity of lime salts or rather of chloride of calcium, for that was the salt experimented with at first, was sufficient for the purpose required, I proceeded to compare the efficiency of different neutral salts. For this purpose I had to choose a standard of comparison, and as the enquiry related at present to the Hugli water, I chose it with reference to the composition of this. Chloride of Sodium or common salt might have been taken, but I found its effect comparatively so small that I gave that up. The really influential constituents in the river water were the salts of lime and magnesia, particularly the carbonates, and as I found that these were of nearly equal power, I decided to take that which existed in largest quantity, namely carbonate of lime, as the standard of comparison. But as a solution of carbonate of lime in excess of carbonic acid is troublesome to prepare, its strength somewhat troublesome to ascertain, the solution itself weak, consequently involving the addition of a notable quantity of water, besides being liable to change, I chose for my working standard a solution of chloride of calcium equivalent in strength to 1 grain carbonate of lime in 50 cubic centimetres of solution, equal to 1.11 gm. chloride of calcium in 50 c. c. This formed a convenient strength for measuring by a pipette. For the composition of the water, I assumed that during the rainy season it contained salts of Lime and Magnesia equivalent altogether to 7 grains of carbonate of lime in 100,000 fln. or .07 gramme in 1 litre. This is equal to 4.9 grains in 1 gallon. Perhaps it is rather too.

low an estimate, 8 grains or even 9 grains to 100,000 being possibly more correct.

A question soon arose as to what was the general nature of the action, for on that I must regulate the plan on which I was to compare different substances. I have quoted Professor Jevons's electrical theory about the coagulation of clay, which is too speculative for practical application,—also Mr. Skey's, that these precipitating substances must act solely from their affinity for water, because the powerful affinities of the component parts of most of these substances precluded the idea of their decomposition. The general tendency of the experiments I made at first, however, led me to reject this explanation, and to conclude that the action was most probably a chemical one, though it might be difficult, or at present impossible, to explain exactly how it operated. In consequence of this I decided to compare, not absolute weights of the different substances, but their chemical equivalents. Reasons for this conclusion will be given presently.

I generally operated on half a litre of water. This was mixed with the substance to be tried and allowed to stand from 24 to 48 hours. A row of such bottles with different substances was placed on the table with one bottle containing unmixed water, and comparison was made of their respective appearances at the end of a certain time, sometimes of two or three times, and the result noted. Different proportions of the same substance were compared in the same way. The conclusions were drawn only from the experiments made on the same water at the same time, not between different samples of water or between observations made at different times.

The substances compared were chiefly, but not exclusively, those found in natural waters. They may be divided into the following classes:—

Alkalies and alkaline earths.

Acids, or Hydrogen salts.

Neutral salts of the alkalies.

Salts of Lime and Magnesia,—or of alkaline earths generally.

Salts of protoxides of heavy metals, namely of Iron, Manganese and  
[Copper.

Salts of the Sesquioxides,—namely of Aluminum and of Iron.

The range might have been considerably extended, and the series have been more complete, but I could not spare the time necessary for a more numerous series; besides, the river water began to improve about the end of August and continued to do so, as the rains ceased early. The experiments, however, were sufficiently numerous to enable me to draw conclusions of interest.

I shall arrange the substances tried in a tabular form, attaching to them numbers indicating the number of chemical equivalents necessary to produce the same effect as Carbonate of Lime in solution in carbonic acid water. The

equivalents will be in relation to the atomic weight of chlorine 35·5; thus,—combined with Sodium 23, Calcium 20, Iron (Ferrosium) 28, (Ferricum) 18·66, forming Sodium Chloride 58·5, Calcium Chloride 55·5, Ferrous Chloride 63·5, Ferric Chloride 54·16, so that equivalents can easily be converted into absolute weights by multiplying by these numbers, and to facilitate this the equivalent numbers are given. The absolute weights are also given in the last column which, it will be observed, are the products of the two first multiplied by 2 to bring them to the standard of Carbonate of Lime taken as 100, the double of its equivalent. The equivalents and absolute weights, also, are all for the substances free from water of combination, crystallization or solution.

*Table of approximate quantities required to produce an equal effect in clarifying the muddy water :—*

|                                                           | Chemical<br>equivalent. | Number of<br>equivalents. | Absolute<br>weight. |
|-----------------------------------------------------------|-------------------------|---------------------------|---------------------|
| Chloride of Sodium or Common Salt, .....                  | 58·5                    | 40·0                      | 4680                |
| Potassa Hydrate, .....                                    | 56·0                    | 5·0                       | 560                 |
| Soda Bicarbonate, .....                                   | 84·0                    | 4·0                       | 672                 |
| Acetic Acid, .....                                        | 60·0                    | 3·0                       | 360                 |
| Sulphuric Acid, .....                                     | 49·0                    | 2·0                       | 196                 |
| Calcium Chloride, or Muriate of Lime, ...                 | 55·5                    | 2·0                       | 222                 |
| Magnesium Chloride, or Muriate of Magnesia, .....         | 45·5                    | 2·0                       | 182                 |
| Nitric Acid, .....                                        | 63·0                    | 1·5                       | 189                 |
| Barium Chloride, .....                                    | 104·0                   | 1·0                       | 208                 |
| Carbonate of Lime, dissolved by Carbonic Acid, .....      | 50·0                    | 1·0                       | 100                 |
| Carbonate of Magnesia, dissolved by Carbonic Acid, .....  | 42·0                    | 1·0                       | 84                  |
| Sulphate of Lime, .....                                   | 68·0                    | 1·0                       | 136                 |
| Sulphate of Manganese, .....                              | 75·5                    | ·5                        | 75·5                |
| Sulphate of Copper, .....                                 | 79·5                    | ·3                        | 31·8                |
| Protosulphate of Iron, .....                              | 76·0                    | ·15                       | 22·8                |
| Protocarbonate of Iron, dissolved by Carbonic Acid, ..... | 58·0                    | ·15                       | 17·4                |
| Alum, .....                                               | 79·2                    | ·05                       | 7·92                |
| Aluminum Chloride, ..                                     | 44·8                    | ·05                       | 4·48                |
| Perchloride of Iron, .....                                | 54·7                    | ·025                      | 2·74                |

Chloride of Potassium or Muriate of Potassa, Sulphate of Potassa, Acetate of Potassa and Phosphate of Soda were about equally efficacious with common salt.

This table shews the very great difference in efficiency between different substances, common salt having only one-fortieth part of the power of the standard Carbonate of Lime when chemical equivalents are compared, or about one-forty-seventh part when actual weights are compared. On the other hand, Perchloride of Iron is forty times as powerful as Carbonate of Lime, chemical equivalents being compared, or about thirty-six times when actual weights are taken.

A glance at the table will shew that the precipitating power is just in proportion to the facility with which the acid and basic constituent of the salt can separate. The alkalies and alkaline earths ought to be excluded as they exert a chemical change in the soluble constituents of the waters, but it appears to me pretty evident that both the acid and basic constituents of the remainder of these substances take part in the effect produced on the clay. Acids themselves do so, as shewn by the table, even so very weak a one as Carbonic acid gas does so when passed for sometime through the muddy water, as I found from direct experiment. And I also found that when using these small quantities of alumina, the addition of a proportion of potash, more or less, to neutralize the acid constituent of the salt was no improvement but the reverse. Pieces of sheet iron, immersed in a bottle of muddy water and shaken occasionally, in a few hours caused the mud to precipitate very well; the iron evidently had been acted on by the Carbonic acid in the water and the atmospheric oxygen to form a small quantity of a salt of iron which produced the effect.

The numbers in the table are by no means to be taken as accurately ascertained. The shortness of the period during which muddy water of nearly similar quality was available rendered this impossible. After the end of August, I employed water from the river mixed in a vessel with the mud deposited from previous water and stirred up, which can scarcely be taken as a very good representative of the water during the worst period of the rains, though probably good enough for the purpose, as the comparisons between different substances were always made with the same water. But as the month of August was chiefly occupied with experiments on the natural constituents of the water, namely alkaline and earthy salts, and those on the effects of the salts of the heavy metals and of the sesquioxides were not made till September when the water had undergone some change, the numbers given for these latter are not quite so certain, possibly may be stated as smaller than they would have been had the August water been used. The decision on this point must be reserved for next rainy season.

It may be well also to state the absolute quantities of these or at least of some of these substances that would be necessary to clarify a given quantity of the muddy water, calculated from the data given. For this purpose the standard will be Carbonate of Lime, dissolved by Carbonic acid, in the

proportion of .07 gramme to 1 litre or 1000 cub. centimetres or 7 pounds to 100,000 pounds of water, which is equal to 700 pounds to 10 million pounds of water or to 1 million gallons. From this the quantity of any other of the substances given in the table may be calculated from the last column by simple proportion. Thus as 100 Carbonate of Lime is to 700 pounds required, so is 136 Sulphate of Lime to 952 pounds required, or 2.74 Perchloride of Iron to 19.18 pounds required for 1 million gallons of the muddy water of the Hugli.

It is necessary to remember, however, that the table given refers to the dry substances, which is the natural condition in which they are usually found in only a few of the substances enumerated in the table, such as Common Salt and Carbonate of Lime. Most of the other substances contain water of crystallization or water of solution, which last may be a very variable quantity. In the latter case the quantity of dry matter in solution must be known. The following table includes a few of the preceding substances most likely to be of practical application :—

*Table of absolute quantities of substances necessary for the clarification of 1 million gallons of muddy water of the Hugli during the rainy season, calculated from the data given above.*

|                                                                    | Pounds. |
|--------------------------------------------------------------------|---------|
| Common Salt, dry, equiv. 58.5, .....                               | 32,760  |
| Chloride of Calcium or Muriate of Lime, fused or dry, eq. 55.5, .. | 1554    |
| Carbonate of Lime, dry, eq. 50, .....                              | 700     |
| Gypsum or native cryst. Sulphate of Lime, eq. 86, .....            | 1204    |
| Sulphate of Iron cryst., eq. 139, .....                            | 159.6   |
| Alum cryst., eq. 151.2, .....                                      | 55.4    |
| Perchloride of Iron, dry, 54.7 .....                               | 19.15   |

It may be also worth noting the proportion of a few of these substances to the water, on the above data.

|                             |      |         |
|-----------------------------|------|---------|
| Common Salt, .....          | 1 to | 305     |
| Gypsum, .....               | 1 to | 8,306   |
| Carbonate of Lime, .....    | 1 to | 14,286  |
| Perchloride of Iron,* ..... | 1 to | 522,000 |

These numbers shew that chloride of calcium is nearly twenty-three times as effective as common salt. Skey estimated it as only twice as effective. Schloesing, as will be stated immediately, estimated chloride of potassium as of only one-fifth of the efficacy of lime salts and chloride of sodium.

\* On referring to my Note Book I find that in July 1866, I had come to the conclusion that about 1 of Perchloride of Iron is sufficient to precipitate the mud from 135,000 of water by standing over night, an approximation at least to the small quantity I have recently found to be sufficient. This was when I was not thinking of its application on the large scale nor searching for a minimum.

weaker still. It will be observed that my numbers differ widely from theirs. The differences are to be accounted for, partly from the circumstance that my examinations have been pushed further than theirs, thus shewing that one lime salt is twice as efficacious as another, that some other salts are far more powerful than lime salts, and that the salts of the heavy metals and particularly of the sesquioxides seem to act on the same principle, which does not appear to have been suspected by either Skey or Schloesing, at least is not alluded to. It is also probably partly due to the differences of the mud operated on, both as respects the composition of the insoluble matter it chiefly consists of, as well as of the soluble matter that it may contain.

V.—I had written thus far when I had an opportunity of seeing Schloesing's paper in the original, in the *Comptes Rendus*, and found it much more complete and interesting than I could have concluded from the brief abstract in the *Chemical News*. He was first led to notice the peculiarity from a circumstance I have mentioned before, namely the treatment of argillaceous soils with distilled water. He not only mentions that distilled water rendered muddy by a mixture of purified fat clay is precipitated by 1-1,000th part of lime salts immediately, but that this is the case also by 1-5,000th part in some minutes and by 1-50,000th part in two or three days. He refers to the muddy water of the Seine becoming limpid in an hour or two by a very small addition of a lime salt, but at the same time states that the Seine water contains 89 milligrammes of lime per litre, equal to 8.9 parts in 100,000 or 15.9 of Carbonate of Lime, a much larger quantity than that which exists in the Hugli water during the rainy season, indeed nearly as much as is found in December and January. Schloesing further directs attention to the influence of this peculiarity on clay soils and on what is called the mechanical analysis of soils; and he further notices the precipitation of mud so carried in rivers by the water of the sea, and also the practical applications suggested by it for clearing muddy water. Indeed he concludes by a reference to the waters of the Durance employed for supplying Marseilles, tracing the muddiness of such waters to their sudden dilution with large quantities of pure water and suggesting a remedy in the restoration of the water to its normal condition by the addition of lime salts or an admixture of some other water containing abundance of these; in complete accordance with all I have been contending for. Schloesing states that Magnesia salts are about equally efficacious with Lime salts, and that salts of Potash are required in about five times the quantity that lime salts are, and that soda salts are still less active. He refers to no other classes of salts, but speaks of Carbonic acid as producing the same effect, attributing its efficacy to the solution of Carbonate of Lime present in the insoluble state.

This idea had occurred to myself, and that also it might explain the



action of the other stronger acids. I am not prepared at present either to admit or deny this. To settle the point would require experiments to be made in which the sources or causes of doubt should be removed. Though it might be supposed that these acids dissolve a small quantity of the otherwise insoluble carbonate of lime, this does not account satisfactorily for the circumstance that the salts of the sesquioxides of aluminum and iron and even of the protoxides of the heavy metals are so much more efficient than lime salts themselves.

I found in another number of the Chemical News, that of 14th May, 1869, an abstract of a "Report of the Netherlands Committee." This committee, evidently, (though particulars are not stated), consisted of a body of scientific men examining the waters of certain rivers with a view to their economical use, the Rhine and Maas being particularly mentioned. So far as I can judge from some particulars mentioned, these waters do not appear to be exactly similar to the muddy water of the Hugli. The committee especially recommend Perchloride of Iron for the purification of such turbid waters, along with Carbonate of Soda, and recommend .032 grains Perchloride of Iron for 1 litre which is equal to 1 part for 31,250. I have given it as 1 to 522,000 and without soda. It is obvious that the question of quantity is very important in the application of this artificial method of clarifying muddy water with a view to economy. The great expense, evident in the application of all proportions known before, was one cause that prevented me from giving the subject much attention, as I had adverted to the use of precipitants as far back as 1867, in my paper in this Journal.\*

One way and the best of all ways of restoring the proper quantity of Lime salts to such water would be to bring it thoroughly in contact with Carbonate of Lime, provided it contained enough of free Carbonic acid to dissolve a sufficient quantity. But this is very doubtful and not very likely in ordinary waters. Experiment shewed only a small improvement.

Both Skey and Schloesing state that the chief point seems to be that there should be a certain quantity of the precipitating substance in proportion to the water, and that the quantity of clay present does not make much difference, Schloesing remarking even that the limpidity is more perfect when the mud attains a certain proportion, just as I have myself found that the muddy Hugli water settled and cleared better by adding some dry soil to it, this of course from the soluble matters contained in that soil. The general point, however, I had not time to examine, my attention having been given to the Hugli water as it presented itself in nature.

Both Skey and Schloesing also describe the effect produced by the term coagulation, and it seems quite appropriate. The very fine particles coalesce as it were into larger and comparatively flocculent ones.

\* Vol. XXXVI, Part II, p. 188.

I was not content with these small experiments but tried the process by clarifying the water first by such small proportions of these precipitants, settling one or two days and then passing through a sand filter, and found it to answer perfectly, the filtration going on easily and rapidly. The apparatus was small, the precipitating vessel holding about 45 gallons, the filter being a Zinc tube of about six inches diameter. There were two filters, one with Palta and one with Magra sand: the Palta sand filtered best as I used as small a quantity as possible of the precipitating substances. I could not try it on a larger scale, as my premises are now no longer on the bank of the river. But there cannot in my opinion be the smallest doubt but that the process would answer admirably on the large scale.

My former experiments, at least in my own judgment, proved that the Hugli water during the rainy season could not be filtered without unusual difficulty, and that arising from a peculiarity in the water which I connected with the peculiar distribution of the rainfall in this country, though I could not then explain the cause:—it was a matter of fact whether it could be explained or not. Plans proposed to overcome this difficulty, supported by experience of water filtration in England, I declared would be useless, because the water was different and English experience therefore not applicable.

One special contrivance, which it was alleged would be effective for the purpose, I had tried, and had given my opinion that it was worthless for the purpose. The best plan for filtering the water of the rainy season as it presents itself in nature, I concluded, would be by the use of the Palta sand, properly managed, which includes a proper relation between the amount of filtering surface and the quantity of water to be filtered. All of these statements and opinions I still adhere to, as they were conclusions drawn from the observation of facts, the highest and only true authority from which scientific conclusions can be drawn.

A new idea has supplied me with the means of explaining the nature of the peculiarity, and that not by superseding but by confirming the correctness of my previous conclusions that it was connected with the tropical rainfall, and that was by producing extreme dilution of the water. It also indicated a way to remedy the difficulty of settling and filtering the water. The evidence has been given in the preceding pages, and is founded also on the authority of experimental facts open to scrutiny and criticism. The conclusions, it appears to me, may be of value not only with reference to the Calcutta water supply, but to the purification of water in cases where the circumstances are similar, occurring more generally in tropical countries, but even occasionally in other localities.

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## NEW BURMESE PLANTS, PART III.—By S. Kurz, Esq.

[Received Dec. 5th.]

[With Plates XVIII &amp; XIX.]

## CAPPARIDÆ.

## 227. CAPPARIS CRASSIFOLIA, nov. sp.

Frutex scandens, spinis brevibus recurvatis armatus, novellis et foliis junioribus subtus tomento minuto canescente obtectis; folia obovalia ad obovata, petiolo  $\frac{1}{2}$ — $\frac{3}{4}$  poll. dum juvenili canescenti-puberulo suffulta, basi magis minusve acuta, apice rotundata et brevissime recurvato-acuta, coriacea c. 2 pollicaria, glabra, nervis crassis subtus conspicuis et præsertim basin versus egredientibus; flores solitarii, iis *C. horridæ* subconformes, pedicello  $\frac{1}{2}$  ad  $\frac{3}{4}$  poll. canescenti-tomentoso suffulti; sepala et petala ferrugineo-lanata; filamenta numerosa, glabra; gynophorum longum et ovarium globosum glabra.—Prome.—*C. horridæ* arcte affinis.

## 228. CAPPARIS POLYMORPHA, nov. sp.

Frutex scandens, glauco-viridis, ramis ramulisque tenuiter albescenti-farinoso-tomentosis, spinis brevibus curvis puberulis armatus; folia (juniora valde elongato-rhomboidæa) rhomboideo-ovata ad obovato-rhomboidæa, petiolo  $\frac{1}{2}$  poll. albescenti-puberulo suffulta, basi obtusa, subcoriacea, obtusa, glauca, subtus et dum juvenilia utrinque, fugaci-albo-puberula, nervis crassis et præsertim basin versus egredientibus; flores solitarii, axillares, iis *C. horridæ* simillimi, pedicello  $\frac{1}{2}$ — $\frac{3}{4}$  poll. canescenti- et pro parte ferrugineo-tomentoso crasso suffulti; sepala et petala ferrugineo-lanata; filamenta numerosa, glabra; gynophorum gracile, glabrum; ovarium glabrum; baccæ (immaturæ) cerasi magnitudine, oblongæ, læves, polyspermæ.—Prome.—Ex affinitate *C. horridæ*. *C. horrida*, *crassifolia* et *polymorpha*, species inter se valde affines, habitu longe distant et sæpius in eodem solo sociatim crescunt.

## MALVACEÆ.

## 229. DECASCHISTIA CRASSIUSCULA, nov. sp.

Frutex humilis, ramosus, dense albido-tomentosus; folia ovata, in petiolo crasso 2—3 lin. tantum longo decurrentia, 2—3 poll. longa, integra v. sublobata, grosse v. obsolete dentata, utrinque dense, subtus albotomentosa; flores sessiles v. subsessiles, 2 poll. fere longi; involucri phylla dense tomentosa, basi bractea longa subulata sustentata; calycis lobi paulum longiores et latiores, tomentosi, crasso-costati; petala stellato-pubescentia, venosa; capsulæ dense tomentosæ.—Prome.—*D. crotonifoliæ* valde affinis, sed differt floribus sessilibus v. subsessilibus, foliis latioribus decurrentibus et petiolo brevissimo.

*STERCULIACEÆ.*230 *STERCULIA ORNATA*, Wall ap. Voigt. Cat. Hort. Calc. 105.

Arbor decidua, novellis pilis coccineis (in sicco brunneis) sæpius glutinosis tomentosis; liber et lignum album (nec rubrum uti in *St. villosa*); folia lata, 5—7-loba, lobis acuminatis, subtus dense stellato-pubescentia, supra pilis brevibus fasciculatis minutis aspersa; flores majusculi, pedicello  $\frac{1}{2}$ —1 poll. longo suffulti, plerumque ochracei in fundo rubicundi, in paniculas terminales coccineo-tomentosas dispositi; calyx puberulus, semilineam longus, lobis lanceolatis patentibus; gynophorum stellato-tomentosum; ovaria fl. fem. dense hispido-tomentosa; carpella 5—6, setis fragilibus lineam fere longis urentibus dense vestita et glabrescentia, c.  $2\frac{1}{2}$ —3 poll. longa, subcylindrico-lanceolata, incurvato-acuminata, intus dense fulvo-setosa; semina plura, oblonga, atra, levia.—Pegu, Martaban, Tenasserim.—*St. villosæ* affinis, inter alia indumento carpellorum et floribus jam distincta.

*MALPIGHIACEÆ.*231. *HIPTAGE ARBOREA*, n. sp.

Arbor parva, decidua, 15—20-pedalis, novellis dense albido v. flavido-tomentosis; folia valde variabilia, oblonga et ovato-oblonga ad elliptica et elliptico-lanceolata, 2—3 $\frac{1}{2}$  poll. longa, petiolo brevissimo crasso, basi obtusa v. rotundata, subcoriacea, dum juniora dense albido-tomentosa et acuta v. breviter acuminata, dein subfloccosa et apiculata v. rotundata, nervis subtus valde prominentibus; flores lilacini v. albi, in fundo aurei, pedicello medio 1—2-bracteolato longo albido-pubescente basi bracteato suffulti, racemos breviores v. longiores albido-pubescentes axillares formantes; sepala obtusa v. acuta, lanato-pubescentia, 2—3 lin. longa; petala unguiculata, fimbriata, reflexa; carpella magis minusve fulvo-tomentella, glabrescentia, alis plerumque securiformi-emarginatis valde inaequalibus (terminali erecta  $1\frac{1}{2}$ —2 poll. longa, lateralibus patentibus plus quam  $\frac{2}{3}$  brevioribus), costa centrali obsoleta.—Prome, Martaban.—Inter species *Hiptugis* generis extricatu difficillimas hæc statura erecta (non scandente) et cortice crassa suberoso-fissa præstat.

*RUTACEÆ.*

## GONOCITRUS, nov. g., Pl. XVIII.

Flores 5-meri (an semper?). Stamina .... Ovarium 3—5-gonum, 3—5-loculare, loculis 2-ovulatis. Bacca coriacea, epulposa, 3—4 angulata. Semina magna, cotyledones carnosæ. Arbuscula spinoso-armata in solo salino rhizophoretorum vicens, foliis simplicibus alternis. Flores solitarii, axillares. Genus distinctissimum sed incomplete cognitum, *Atalantiæ* affine.

232. *G. ANGULATUS* (*Citrus angulatus*, Willd. sp. pl. III. 1426; Bumph. Herb. Amb. 110, t. 32; DC. Prod. I. 540; *Ataluntia longispina*

Kurz in Journ. As. Soc. Bengal, 1872 295). Baccæ epulposæ, sed intus succo viscido parco (oleo condensato ?) vestitæ. Flores albidī (ex Rumph.).

### LEGUMINOSÆ.

#### 233. CROTALARIA KURZII, Baker MS.

Herba annua, erecta, ramosa, 1—3-pedalis, ramis teretibus parce appresse pubescentibus; folia obovato-ad lato-lanceolata, basi subcuneata, brevissime (1—2 lin.) petiolata, mucronato-acuta v. subcuspidata,  $1\frac{1}{2}$ —3 poll. longa, raro longiora, subtus parce puberula et pallida; flores mediocres, lutei, vexillo extus atropurpureo-striato, pedicello  $\frac{1}{4}$ — $\frac{1}{2}$  poll. pubescente suffulti, vulgo solitarii v. raro bini, hinc inde fasciculatim ex foliorum axillis erumpentes simulque in racemos axillares et terminales parce pubescentes dispositi; bracteæ minutæ, subulatæ; calyx semilineam circiter longus, parce appresse puberulus, lobis falcato-lanceolatis acuminatis; corolla calyce longior; legumen  $\frac{1}{2}$  ad  $1\frac{1}{2}$  poll. longum, sessile, basi attenuatum, glabrum; semina pallida v. pallide brunnea, nitentia, lin. lata. Var. *a.* genuina, folia minora,  $\frac{1}{2}$  poll. non excedentia; legumen  $\frac{1}{4}$ —1 poll. tantum longum et calyce duplo longius; semina pallida, lineam lata.—Pegu, Martaban.—Var. *β.* luxurians, folia 6 poll. longa; legumen  $1\frac{1}{2}$ —2 poll. longum et calyce 3—4 plo longius; semina brunnea,  $2\frac{1}{2}$  lin. circiter lata. Pegu. Var. *β*, ejus flores non vidi, cum forma typica, characteribus supra indicatis exceptis, omnino quadrat.

#### 234. INDIGOFERA CALONEURA, nov sp.

Frutex erectus, ramosus, fulvo-puberulus; stipulæ c. 2 lin. longæ, lineari-subulatæ, dense pubescentes; folia 1-foliolata, petiolo 3—4 lin. longo crasso dense fulvo-pubescente suffulta; foliolum ellipticum, utrinque rotundatum v. scapius apice retusum, mucronulatum, 3—4 lin. longum, chartaceum, supra glabrum, subtus molli-pubescentem et glaucescentem, costa nervis venisque valde prominentibus et fulvo-pubescentibus; flores rosæ?, parviseuli, pedicello 2 lin. longo filiformi puberulo suffulti et racemum robustum pubescentem axillarem foliis vulgo brevioribus formantes; bracteæ longiusculæ, subulatæ; calyx brevis sed amplus; lineam vix altus, dentibus 3-angularibus acutis; corolla c.  $\frac{1}{2}$  poll. longa; ovarium dense sericeo-pubescentem; legumen deest.—Pegu.—Ex affinitate *J. Brunonianæ*, Grah.

#### 235. DESMODIUM OBCORDATUM (*Uraria obcordata*, Miq. Suppl. Fl. Sumatr. 114 et 305).

Herba perennis, volubilis, 3—4-pedalis, puberulus; stipulæ lanceolatæ, acuminatæ, pubescentes, c. 3 lin. longæ; folia pinnatim 3-foliolata, petiolo  $\frac{1}{2}$ —1 pollicari puberulo; foliola lateralia minora, deltoidea, retusa et mucronato-apiculata, foliolum terminale transverse obcordato-lunatum,  $\frac{1}{2}$ —2 poll. latum, in sinu mucronatum, chartaceum, supra tenuissime subtus parce pilosum et pallidum, venis transversis prominentibus; flores parvi, cyaneo-

purpurei, pedicello gracili 2—8 lin. longo pubescente, in racemum gracilem pubescentem axillarem sæpius in paniculam terminalem abeuntem dispositi; bracteæ lineares, subulato-acuminatæ, 2—3 lin. longæ, pubescentes, caducissimæ; calyx pubescens, lineam circiter longus, lobis lanceolatis acuminatis; corolla  $2\frac{1}{2}$  lin. longa; legumen in stipitem 1 lin. longum attenuatum, recurvatum, planum, chartaceum, puberulum, moniliformi-2—3, v. sæpius 1-articulatum; articuli hastato-rotundati, c.  $\frac{1}{3}$  poll. longi et lati; semina reniformi-oblonga, compressa, brunnea, nitentia.—Tenasserim.—Ex affinitate *D. strangulati*, &c.

236. *DESMODIUM OBLATUM*, Baker MS. (*Desmodium reniforme*, Wall. Cat. vix De. certissime non Burm.).

Fruticulus erectus, gracilis, 2—3-pedalis, glaber; stipulæ et stipellæ minutæ; folia 1-foliolata, petiolo capillari  $\frac{1}{2}$ — $\frac{1}{2}$  pollicari suffulta; foliolum transverse ellipticum, apice subsinuatum v. rotundatum, 1— $1\frac{1}{2}$  poll. latum, integrum, glabrum, læte virens; flores parviusculi, cyanei, pedicello capillari c.  $\frac{1}{3}$  pollicari puberulo, fasciculati et racemum gracillimum puberulum axillarem in paniculam terminalem abeuntem formantes; bracteæ persistentes, ovatæ; calyx  $\frac{1}{2}$  lin. longus, subglaber, lobis lineari-lanceolatis acuminatis; corolla sub—3 lin. longa; legumina in stipitem brevissimum contracta, compressa, minute puberula et glabrescentia, lineari-oblonga, moniliformia, 2—4 passim 1-articulata, articuli semiorbicularis, suturâ exteriori vix curvâ, reticulati, c. 2 lin. longi v. longiores; semina compressa reniformia pallide brunnea nitentia.—Ava, Pegu, Martaban.—Ex affinitate *D. reniformis*, &c.

237. *DESMODIUM AURICOMUM*, Grah. in Wall. Cat. 5704.

Herba annua a basi ramosa patenter fulvo-pilosa; stipulæ lanceolatæ, aristato-acuminatæ, striatæ, 2— $2\frac{1}{2}$  lin. longæ; folia pinnatim 3-foliolata, petiolo parce piloso 3—4 lineari suffulta; foliola elliptica ad obovalia, rotundata v. subretusa,  $\frac{1}{2}$ — $\frac{2}{3}$  poll. longa, supra subglabra, subtus parce appresse pilosa; flores parvi purpurei, pedicello capillari piloso  $\frac{1}{2}$ — $\frac{1}{2}$  pollicari, racemum gracilem patenti fulvo-pilosum terminalem v. ramulos axillares terminantem formantes; bracteæ vulgo sub anthesi persistentes, ovatæ, subulato-acuminatæ, 3—4 lin. longæ, fulvo-pilosæ; calyx  $1\frac{1}{2}$  lin. longus, fulvo-pilosus, lobis linearibus subulatis; corolla æquilonga v. paulo longior; legumina plana, sessilia, lineari-oblonga, ciliata et intra marginem villosa-pilosa, laxè reticulata, 3—5-articulata, articuli lin. circiter longi et lati, suturâ interiori rotundati exteriori subrecti, dehiscentes; semina reniformia, brunnea, nitentia.—Arracan, Tenasserim.—Ex affinitate *D. triflori*, &c.

238. *LESPEDEZA PINETORUM*, nov. sp.

Frutex subsimplex v. ramosus robustus erectus 2—4-pedalis dense fulvescenti-pubescent; folia 3-foliolata, petiolo  $\frac{1}{2}$ — $\frac{1}{2}$  pollicari villosa suffulta; foliola elliptica ad elliptico-ovata, brevissime crasseque petiolata, 1—2

poll. longa, obtusa v. acuta cum mucrone, integra, coriacea, supra subrugosa et parce subtus dense fulvescenti- v. subcanescenti-villosa et prominenter nervosa; flores parviusculi, cyanei v. rosei, pedicello lin. longo gracili pubescente suffulti in racemos villosopubescentes robustos sed breviusculos axillares v. terminales dispositi et sæpius paniculam densam terminalem efformantes; calyx c.  $2\frac{1}{2}$  lin. longus, fulvescenti-villosus, lobis subulatis; corolla  $3\frac{1}{2}$  lin. longa, glabra; legumen dimidiato-ovatum, 3 lin. longum, sericeo-pubescent. — Martaban. — *L. hirtæ*, Miq. quodammodo affinis.

239. *LESPEDEZA DECORA*, nov. sp.

Frutex erectus, 3—5-pedalis, caulibus angularibus appresse fulvo-pubescentibus dein canescentibus; stipulæ c. 3 lin. longæ, rigidæ, lineari-subulatæ; folia pinnatim 3-foliolata, petiolo gracili 1— $1\frac{1}{2}$  pollicari canescente suffulta; foliola breviter petiolulata, obovalia ad elliptica, apice rotundata mucronata, chartacea, 1— $1\frac{1}{2}$  poll. longa, supra atroviridia, glabra, subtus glaucescentia et sub lente appresse pubescentia; flores carulei, pedicello gracili c.  $\frac{1}{2}$  pollicari glanduloso-pubescente instructi, racemos breves at graciles fulvoglanduloso-pubescentes persistenter bracteatos sæpius in paniculam brevem collectos efficientes; bractea ovato-lanceolata, subulato-acuminatæ, c. lin. longæ, glanduloso-puberulæ; calyx c. 3 lin. longus, fulvo-pubescent, lobis ovatis acuminatis; corolla  $\frac{1}{2}$  poll. longa; legumina (immatura) oblique ovato-lanceolata, acuminata, compressa, breviter sericea. — Martaban. — Hic *Desmodium angulatum*, Wall. Cat. 5729, I. quoad specimina sterilia probabiliter e Taong-dong sumpta.

240. *LESPEDEZA PARVIFLORA*, nov. sp.

Frutex, ramulis angularibus sericeo-puberulis; stipulæ rigidæ, lineari-subulatæ, c. 2— $2\frac{1}{2}$  lin. longæ; folia pinnatim 3-foliolata, petiolo gracili canescente  $\frac{1}{2}$  poll. longo suffulta; foliola breviter petiolulata, elliptica ad elliptico-ovata,  $\frac{1}{2}$ —1 poll. longa, chartacea, supra glabra et atroviridia, subtus glaucescentia et appresse puberula; flores cyanei?, parvi, pedicello  $\frac{1}{2}$ —1 lin. longo fulvo-pubescenti instructi et in racemos axillares strictos fulvo-pubescentes folio circiter duplo longiores apice ramorum sæpius congregatos dispositi; bractea decidua; calyx dense fulvo-pubescent, c. 2 lin. longus lobis subulatis; corolla  $3\frac{1}{2}$  lin. circiter longa; legumina (immatura) oblique ovata, acuminata, sericea. — Martaban (Rev. F. Mason). — *L. elliptica*, Bth affinis, a qua differt: floribus multo minoribus, calycis lobis subulatis, bracteis deciduis et indumento.

241. *MUCUNA BRACTEATA*, Dc. (*Carpopogon bracteatus*, Roxb. MS. Jc, XX. t. 138).

Herba perennis, volubilis, novellis parce appresse pubescentibus; stipulæ...; folia pinnatim 3-foliolata, petiolo glabro v. subglabro 2—4 pollicari suffulta; foliola ovata v. subovata (lateralibus valde obliquis, terminali magis trapezoido), petiolulo brevi pubescenti suffulta, obtusiuscule apiculata v.

cuspidata, mucronata, chartacea, supra glabra, subtus puberula v. sub lente appresse pubera; flores magni, atropurpurei, pedicello canescenti-puberulo c. 2 lin. longo suffulti, 2—3-ni v. solitarii pedunculum secundarium 2—3 lin. longum terminantes et in racemum bracteato-pedunculatum axillarem nutantem canescenti- v. fulvescenti-pubescentem dispositi; bracteae ovatae ad lanceolatae, subulato-acuminatae, velutinae, florales valde deciduae, inferiores vacuæ pedunculum vestientes persistentes, majores,  $\frac{1}{2}$ — $\frac{3}{4}$  poll. longæ; bracteolæ paulo minores, rotundatae, deciduae; calyx amplus, c. 4—5 lin. in diametro, dense canescenti-puberulus et setis fragilibus fulvescentibus aspersus; corolla c.  $1\frac{1}{2}$  poll. longa, alæ subduplo, carina vexillo subtriplo longiores; legumina oblonga v. suboblonga, compressa, 1— $2\frac{1}{2}$  poll. longa, carinis longitudinalibus secus suturam superiorem destituta densissime urenti-setosa, 2—5 sperma; semina transverse oblonga, vulgo brunneo et atro-maculata.—*Pegu, Martaban, Ava.*—Species distinctissima, *M. prurienti* affinis.

242. *GRONA FILICAULIS*, nov. sp.

Volubilis, tenera; folia lato cordato-ovata, petiolo pubescente  $\frac{1}{2}$ — $\frac{3}{4}$  pollicari suffulta, obtusa, mucronata, 1— $1\frac{1}{2}$  poll. lata, utrinque sparse hirsuta, palmati nervia; flores parvi, flavi, pedicellati, cirrhoso-pedunculati, axillares; legumina tenera, glaberrima, linearia, poll. circiter longa, 5—6-sperma; semina nitentia, olivacea, nigro-maculata.—*Pegu.*—*G. Grahamii*, Bth. affinis.

243. *PUERARIA BRACHYCARPA*, nov. sp.

*A. P. ferruginea* (*Amphicarpea ferruginea*, Bth. in Pl. Jungh. I.) differt: omnibus partibus glabrior, leguminibus torosis appresse pubescentibus sub-glabrescentibus pollicem vix excedentibus 3 lin. fere latis 5—6-spermis.—*Pegu.*

*ROSACEÆ.*

*Pyrus Karensium* Kurz, in Journ. A. S. Bengal, 1872, 306, eadem est ac *P. granulosa*, Bertoloni Piante nuove Asiatiche 10, t. 3, (sub nom. *P. granulata*) in memorie dell' Accademia d. scienze dell' istituto di Bologna, Ser. II, Vol. IV. 1864-65. Planta Khayana cl. Bertolonii valde est serratifolia, sed formæ intermediæ etiam in Herbario Horti Calcuttensis adsunt. Species fere omnes Indicae a cl. Hookero et Thomsonio collectæ et in opusculo hic citato descriptæ et iconibus illustratæ inapte propositæ sunt.

*MYRTACEÆ.*

244. *EUGENIA PACHYPHYLLA*, nov. sp.

Arbor glabra, ramulis albis; folia obovata ad obovato-oblonga, basi magis minusve cuneato-acuminata, petiolo crasso 3—4 lin. longo suffulta, obtusiuscula v. obtusiuscule apiculata, 3—4 poll. longa, crasse coriacea, glabra, in sicco fuscescentia, nervis lateralibus tenuibus et prominentibus



satis distantibus et subirregulari-parallelis; flores mediocres, vulgo solitarii v. terni, sessiles paniculam brevissimam crassam trichotomam terminalem efformantes, pedunculo et ramis brevissimis ( $\frac{1}{2}$ — $\frac{1}{2}$  poll.) crassissimis 4-gonis articuliformibus; calyx c. 4 lin. longus, obconicus, basi attenuatus, lævis, limbo 4-lobo, lobis rotundatis c. 2 lin. longis persistentibus; petala, etc. desunt.—Tenasserim (Dr Brandis).—Ex affinitate *E. grandis*.

245. *EUGENIA CERASIFLORA*, nov. sp.

Arbor magna, 90-100 pedalis, glabra, ramulis albidis compressiusculis; folia magis minusve lato-lanceolata, basi acuta v. acuminata, petiolo  $\frac{1}{2}$ — $\frac{3}{4}$  poll. longo, obtusiuscule acuminata v. passim obtuse apiculata, 4—7 poll. longa, pergamacea, glabra, opaca, subtus pallida, nervis lateralibus sat irregulari-parallelis et sæpius curvis tenuibus sed prominentibus; flores parviusculi, albi, pedicello gracili 2—4 lin. longo suffulti, in racemum brevem gracilem glabrum axillarem v. supra foliorum delapsorum cicatricibus orientem collecti; calyx  $3\frac{1}{2}$ —5 lin. longus, ejus pars superior ampliatus c. 3 lin. longa, clavato-turbinatus, lævis, limbo persistente 4-lobo, lobis semiorbicularibus 2 lin. fere longis, pars inferior pedicelliformi-contracta gracilis  $\frac{1}{2}$ —2 lin. longa; petala c.  $\frac{1}{2}$  poll. longa, concavo-orbicularia, libera; filamenta longa, gracilia; bacca globosæ v. didymo-globosæ, pisi magnitudinis, in stipitem longum gracilem protractæ, 1—2 spermæ, læves, calycis limbo disciformi patente coronatæ.—Martaban (Etian in montibus Sikkim Himalaya, Khasya, etc. Species juxta *E. lanceæfoliam* inserenda.

246. *EUGENIA TRISTIS*, nov. sp.

Arbor glabra, ramulis teretibus crassis pallide brunneis; folia elliptica ad elliptico-obovata, basi acuta, petiolo  $\frac{1}{2}$ — $\frac{3}{4}$  poll. longo crasso, obtuse-apiculata, coriacea, 4—5 poll. longa, glabra, opaca, nervis lateralibus subdistantibus et sat irregularibus crassiusculis et prominentibus; flores...; panicula fructicans corymbiformis, sessilis, terminalis, glabra, ramificationibus brevibus et robustis; baccæ pedunculo crasso 1—2 lin. longo suffultæ, depressæ-globosæ, cerasi magnitudinis, glabræ, calycis limbo discoideo patenter 4-lobo coronatæ, 2 v. 1 spermæ, endocarpio tenui carnosæ; calycis lobi sub fructu c.  $1\frac{1}{2}$  lin. longi, rotundata.—Tenasserim. Ex affinitate *E. grandis*, sed foliorum indole longo distat.

247. *BARRINGTONIA AUGUSTA* (*Stravadium augustum*, Wall. Cat. 2637 pp.)

Arbor mediocris glabra; folia cuneato-oblonga ad obovato-cuneata, basi attenuata obtusa v. acuta, petiolo crasso 3—4 lin. longo, acuta v. subacuneata,  $\frac{1}{2}$ — $1\frac{1}{2}$  ped. longa, sursum crenulato-serrata, chartacea, glabra; flores conspicui, sessiles, in spicam longissimam fulvo-pulverulentam terminalem dispositi; rachis crassa basi foliis numerosis reductis lanceolatis cincta; calyx velutinus, tubo c. lin. longo v. longiore alatum 4-gono, lobis rotundatis c. 2 lin. longis; petala...; baccæ (immaturæ) fibroso-carnosæ,

oblongæ, fulvo-pulverulentæ, calycis limbo coronatæ, 4-alatæ, alis carnosis et crassis angustis undulatis.—Tenasserim.

248. *BARRINGTONIA PTEROCARPA*, nov. sp.

Arbor mediocris, 30—50-pedalis, glabra; folia elongato-obovato-lanceolata, basi cuneato-acuminata in petiolum breviorē v. longiorē (usque  $\frac{1}{2}$  poll. longum) decurrentia, breviter acuminata. 1—1 $\frac{1}{2}$  ped. longa, apicem versus crenulato-serrata, pergamacea, glabra; flores conspicui, albi v. rosci (filamentis albis), sessiles, spicam longissimam robustam pulverulentam terminalem efficientes, rachis crassa basi foliis floralibus reductis numerosis lanceolatis cincta; calyx velutinus, tubo lineam circiter longo alatum 4-angulato, limbo 4-fido, lobis triangulari-ovatis acutis v. obtusiusculis plus quam 3 lin. longis; petala  $\frac{3}{4}$  poll. longa, ovato-oblonga, acuta; baccae oblongæ, fibroso-carnosæ, c. 2 poll. longæ, 4-gonæ, angulis anguste et crasse alatis.—Pegu, Martaban.—*B. augustæ* valde affinis sed differt foliis longe decurrentibus et calycis lobis.

*LYTHRARIÆ.*

249. *LAGERSTÆMIA MACROCARPA*, Wall. Cat. 2114; Voigt. Hort. Calc. 132.

Arbor parva v. mediocris 30—40-pedalis decidua, glabra; folia oblonga ad ovato-oblonga, breviter petiolata, vulgo larga præsertim juniora usque 1 $\frac{1}{2}$  ped. longa, adulta 5—6—9 poll. longa, basi obtusa v. rotundata, chartacea, obtusa, obtusiuscule apiculata v. passim acuminata, integra, glabra; flores magni, 3—4 poll. in diametro, speciosi, violacei v. violaceo-purpurei, pedicello crassiusculo canescenti-pulverulento suffulti, solitarii v. 2-ni—3-ni cymosi et in paniculam depauperatam terminalem breviusculam collecti; calycis alabastrum oblongo-turbinatum, canescenti-velutinum, tenui-sulcatum nec costatum, lobis lanceolatis acutis secus margines haud incrassatis; petala 1—1 $\frac{1}{2}$  poll. longa, lato-elliptica v. suborbicularia, unguiculata, crispato-undulata; stamina æquilonga; capsulæ lignosæ, 1—1 $\frac{1}{2}$  poll. longæ, oblongæ mucronatæ; semina *L. Flos reginæ*, sed majora.—Birmania tota.—*L. Flos reginæ* valde affinis.

250. *LAGERSTÆMIA VILLOSA*, Wall. MS. in H. B. C.

Arbor magna, 80—90-pedalis, in locis siccioribus 40—50-pedalis, ramulis, &c. dense puberulis; folia ovata ad ovato-oblonga, petiolo brevissimo pubescente suffulta, basi rotundata, chartacea, magis minusve acuminata 2—4 poll. longa, supra minute velutina, subtus subcanescenti-pubescentia v. puberula; flores parvi, albi, pedicello gracili pubescente, in cymas pedunculatas dispositi et paniculam terminalem contractam molliter puberulam efformantes; calyx in alabastro turbinatus, dense canescenti-puberulus, 4—5—6-lobus, lobis triangularibus acutis tubum 4—6-costatum longitudine fere sequantibus, costis subaliformibus; petala minuta, calycis

dentes haud superantia, cuneato-lanceolata, acuta, alba; antheræ purpureæ; capsulæ oblongæ, semipollicem circiter longæ, mucronulatæ, valvatim 4—6-loculares.—Pegu, Martaban.

### GENTIANÆ.

#### 251. GENTIANA NUDICAULIS, nov. sp.

Herba erecta annua glabra cauli tereti nudo 1—2 pollicari; folia apice rosulata, lineari-lanceolata ad linearia, basi subattenuata sessilia acuta v. acuminata, usque ad  $1\frac{1}{2}$  poll. longa, coriacea, 3-nervia (nervis supra impressis); flores cyanei, raro pallide coerulei, depauperato-cymosi et foliosopedunculati v. (in spp. Burmanicis) in glomeros densos axillares et terminales congregati; calyx  $\frac{1}{2}$  poll. longus, infundibuliformis, plicato-5-angulatus, usque ad medium 5-lobus, lobis lineari-subulatis albo-marginatis; corolla semipollicaris v. paulum longior, plicato-5-loba, lobis acutis v. acuminatis; stamina corollam longitudine subæquantes; filamenta stricta, sub medio corollæ tubi inserta; ovarium lineare, in stipitem brevem attenuatum; capsula clavata, crasse et breviter stipitata, a medio ala sursum latissima cincta stylis 2 revolutis coronata; semina minuta, exalata, oblonga. Var.  $\alpha$ . genuina, ramuli evoluti et florentes paniculam spuriam efformantes; var.  $\beta$ . compacta, ramuli suppressi indeque flores compacto-glomerati.—var.  $\alpha$ . montes Assamitæ (Griff. No. 5819); var.  $\beta$ . Martaban.

#### 252. GENTIANA CRASSA, nov. sp.

Suffrutex ramosus deorsum defoliatus; folia lanceolata ad obovato-lanceolata, basi attenuata et cum folio opposito in vaginam brevem connata, inferiora  $1\frac{1}{2}$ —2 pollicaria, coriacea, obtusiuscule acuminata, 3-nervia, secus margines subrevolutos suberenulata: flores majusculi, sessiles et glomerati et cymam terminalem majorem v. minorem foliatam compactam formantes; calyx fere  $\frac{3}{4}$  poll. longus, tubuloso-campanulatus, teres, profunde 5-lobus, lobis valde inæqualibus, quorum 3 minimis lineari-lanceolatis o basi truncata abrupte emissis, cæteris 2 subfoliaceis tubi fere longitudinis oblongis acuminatis basi attenuatis 1-nerviis; corolla pollicaris, infundibuliformi-campanulatus, plicato-5-lobus, lobis lato-ovatis, abrupte acuminatis; stamina corollæ breviora, filamentis basin versus sensim latioribus tubo basin versus insertis; ovarium lineari-lanceolatum, in stipitem crassum attenuatum; capsula compresso-lanceolata, acuminata, e corollâ marcescente semi-exserta, stipite plusquam  $\frac{1}{2}$  poll. longo suffulta, valvis stylo brevi revolutis terminatis.—Martaban.

#### PHYLLOCYCLUS, nov. g.

Calyx campanulatus, inflatus teres. Corolla subregularis, lobis imbricatis, basi sæpius bimaculatis. Stamina 4, 2 inferiora longiora fertilia exserta polline miniato scatentia, 2 superiora subinclusa filamentis brevibus suffulta effeta. Ovarium 1-loculare, ovulis numerosis placentæ bifidæ paris-

tali insertis; stylus deciduus; stigma bilobum. Capsula 1-locularis, septicide bivalvis. Semina plurima, placentis spongiosis immersa, minuta. Herba annuæ facie Cyclophylli generis *Canscora*, sed foliis omnibus perfoliatis caulibus teretibus et floribus vulgo solitariis axillaribus. Genus *Canscora* inter alia differt: corollæ lobi 2 inferiores approximati a medio tali modo replicati ut plicis arcuè approximatis quasi lobum singulum mentient indeque corollam prima facie 3-lobam immitent; stamina 4, quorum unum tantum fertile et multo longius in plica loborum inferiorum receptum, cætera multo minora effata sunt.

253. PH. HELFERIANA, (*Canscora Helferiana*, Wall. MS.).

Herba annua dichotomo-ramosa glabra 1—2-pedalis; folia perfoliata, orbicularia,  $\frac{1}{2}$ —1 poll. lata, radiato-venosa, membranacea; flores parvi, albi, pedicello brevissimo gracili suffulti, solitarii, axillares; calyx lævis, teres, campanulatus, c. 3 lin. longus, lato-4-dentatus; corollæ tubus calycis longitudine, inflatus, limbo parvo 4-lobo, lobis oblongis obtusiusculis; capsula ..... —Tenasserim (Helf. 5816).

Altera species hujus generis, *C. Parishii*, Hook. Bot. Mag. t. 5429, facile distinguitur floribus duplo majoribus, lobis multo latioribus, etc.

#### PEDALINEÆ.

254. BRANDISIA DISCOLOR, Hf. et Th.

Capsula ovalis, compressiuscula, semipollicem fere longa, calyce subduplo longior, fulvo-tomentosa, mucronata, semina linearia, 2 lin. longa.—*Wightiae*, Wall., arcuè affinis. Etiam *Buddleia* generi affinis, sed differt corolla irregulari, etc. et certissime inter Sesameas recipienda est. Gardneria, a cl. Benthamio Loganiaceis adnumerata, Solanea esse videtur.

#### EUPHORBIACEÆ.

255. ACTEPHILA PUBERULA, nov. sp.

Frutex 4—8-pedalis, novellis minute puberulis; stipulæ ovatæ, breves valde deciduæ; folia elliptico- v. obovato-oblonga, basi rotundata v. subcordata, petiolo  $\frac{1}{2}$ —1 $\frac{1}{2}$  pollicari puberulo glabrescente suffulta, 4—7 poll. longa, obtusiuscule acuminata, integra, crasse membranacea v. chartacea, supra glabra, subtus secus nervos puberula et glabrescentia, in sicco flavescenti-viridia; flores aurantiaci, monoici v. dioici, solitarii, axillares; calyx coriaceus; capsula cerasi magnitudine, granulato-rugulosa, pedunculo sursum incrassato  $\frac{1}{2}$ —2 pollicari glabro suffulta.—Andamans (etiam in insulis Nicobaricis).—*Actephila* habitu et characteribus generi *Trigonostemoni* valde accedit sed ovulorum numero distinguitur. *Tylosepalum aurantiacum*, Kurz, quod cl. Muell. Arg. ad Codicem duxit, ad genus *Trigonostemon* repellendum est ubi in sect. VI. *Eutrigonostemone* inserendum (cf. Teyssm. et Binnend. Cat. pl. hort. Bogor 1868, p. 228).—

256. *ANTIDESMA FRUTICULOSUM*, nov. sp.

Fruticulus 2—4-pedalis ramosus pubescens; stipulæ lineares, acuminatæ, fulvo-pubescentes, petiolo longiores, 2—3 lin. longæ; folia parva, elliptico-ad obovato-lanceolata, petiolo crasso c. lin. longo fulvo-pubescente, basi attenuatâ rotundata v. obtusa, 1—2½ poll. longa, breviter et obtusiuscule acuminata cum mucrone, passim obtusa v. retusa, membranacea, supra sparse hirsuta subtus imprimis secus nervos adpresse pubescentia; flores minuti, sessiles, in spicas breves sat robustas fulvo-tomentosas simplices v. raro compositas vulgo e ramulis reductis ortas collecti; bracteæ ovato-lanceolatæ, pilosæ, minutæ; calyx extus tomentosus, 4-partitus, lobis rotundatis subacutis; discus subglaber; stamina 2 v. 3, antheris didymis; stylus terminalis, simplex; drupæ rubræ dein atropurpureæ, suboblique ovoides, læves, 2—2½ lin. longæ, putamine compresso subrugoso.—Pegu.—*A. Roxburghii*, Wall. valde affinis, sed omnibus partibus minor.—*N. B. A. molle*, Mull. Arg. synonymon est *A. velutinosi*, Bl.; bracteæ dum juveniles obovatæ, dein sub anthesi lineari-lanceolatæ.

*GLOCHIDION*, FORST.

Genus distinctissimum, a cl. Muell. Arg. cum *Phyllanthi* genere inapte conjunctum, structura florum femineorum et etiam (uti jam beat. Roxburghius docuit) arillo (spurio) facile distinguitur. In sicco hic arillus spurius v. potius tegumentum exterius seminis ut plurimum pulchre miniatus v. coccineus succosus more Euphorbiacearum aliarum (e. g. *Claoxylon* etc.) membraniformis indeque ab auctoribus plurimis omnino prætervisus erat. Omnes species a cl. Muell. Arg. in Dc. Prod. vol. XV. et a cl. Benthamico in Flora Austr. vol. VI. sub *Eu.*- et *Hemi-glochidione* publicatæ iterum ad genus *Glochidii* reducendæ sunt.

257. *GLOCHIDION DASYSTYLUM*, nov. sp.

Arbuscula v. frutex 15—20-pedalis, pubescens, ramulis subteretibus fulvo- v. ferrugineo-hirsutis; folia ovata, subobliqua, petiolo 1 lin. longo tomentosa, acuminata, basi rotundata v. obtusa, 2—3 poll. longa, chartacea, molliter pubescentia, adulta supra minute puberula; flores desunt, feminei fasciculati v. subumbellati; capsulæ pedicello gracillimo usque ad ¼ poll. longo piloso suffultæ, depresso-globosæ, c. ¼ poll. in diametro, 3-loculares et 6-lobulatæ, patenter albo-pilosæ; columna stylaris brevis, 3-fida, lobis linearibus simplicibus patentibus pubescentibus.—Martaban.—*Gynoon hirsutum*, Wight Ic. t. 1909 habitum plantæ supra descriptæ optime representat sed certissime specifice distinctum est.

258. *GLOCHIDION LEIOSTYLUM*, nov. sp.

Frutex magnus v. arbuscula, ramulis subangulatis novellisque pubescentibus; folia oblique ovata ad oblongo-ovata, petiolo lin. longo pubescente, basi inæquali acuta v. obtusa, longius v. brevius sæpius obtusiuscule acuminata et mucronata, chartacea, supra costâ exceptâ glabra, subtus præser-

tim secus nervos puberula; flores minuti, masculi pedicello longo gracili pubescente, feminei sessiles v. subsessiles, glomerati; maris calyx vulgo 5-fidus, lobis lanceolatis acutis; stamina 3; fem. calyx 5-partitus, parce pubescens, segmentis lineari-lanceolatis acuminatis; ovarium villosum; columna stylaris conica, sursum attenuata et 3-fida, lævissima; capsulæ omnino iis *G. dasystyli* conformes, depresso-globosæ, c.  $\frac{1}{2}$  poll. in diametro, 3-loculares et 6-lobulatæ, pilosulæ, sessiles v. brevissime pedunculatæ stylis glabris.—Pegu, Martaban, Tenasserim.—Priori arcte affinis.

259. *GLOCHIDION ANDAMANTICUM*, nov. sp. (*Phyllanthus Andamanicus*, Kurz in And. Rep. ed. 1. p. XVI.)

Arbuscula 25-pedalis glaberrima, ramulis compresso-angulatis; folia elliptica v. elliptico-oblonga, inferiora sæpius minora et suborbiculari-elliptica, basi acuta v. obtusa, petiolo  $1\frac{1}{2}$ — $2\frac{1}{2}$  lin. longo suffulta, obtusa v. obtusiusculo acuminata, 2—3 poll. longa, tenui-coriacea, lævia, subtus glaucescentia, flores fem. parvi, sessiles, glomerati, masculi pedicello gracili puberulo suffulti, axillares, fasciculati: calyx maris puberulus, lobis oblongis obtusis; stamina 3; calyx fem. 5-lobus, parce puberulus; ovarium villosu-tomentosum, columna stylaris crasse conica, ovarii crassitudine, truncata, stigmatibus 5—6 tuberculiformibus terminata; capsulæ 6—4-coccae, depresso-globosæ, utrinque concavæ, canescenti-puberulæ et 12—8-sulcatæ, plus quam  $\frac{1}{2}$  poll. in diametro.—Andamans.—Ex affinitate *G. Bancani*, Miq. speciei haud cum *G. Zeylanico* conjungendæ.

### CICCA, L.

Sub nomine hocce *Phyllanthi* species epicarpio carnoso a me conjunguntur; structura florum et masculorum et femineorum autem valde diversa est, viz.

Subg. I. *EUCICCA* (Cicca, L.) Flores tetrameri. Stamina libera 4. Glandulæ in maribus et hermaphroditis liberæ et distinctæ. Capsulæ drupaceæ, magnæ, carnosæ, sæpius 4-coccae.

Subg. II. *SECURINEUA*, Muell. Arg. Flores 5-meri. Stamina 5, libera. Discus annulari-5-gonus. Capsula bacciformis, 3- v. abortu 2-cocca, alba, in vivo magis minusve succulenta.

Subg. III. *KIRGANELIA*, A. Juss. Flores 5—6-meri. Stamina diadelphæ, interiora 3 omnino, exteriora basi tantum connata. Glandulæ in fem. distinctæ. Capsulæ bacciformes, 12—6-coccae, succulentæ, purpureæ v. atropurpureæ.

Subg. IV. *EMBLICA*, Gærtn. Flores vulgo 6-meri. Stamina in columnam connata. Ovarium 3-loculare. Glandulæ in fem. urceolato-connatæ. Capsulæ drupaceæ, magnæ, aqueo-albæ, putamine capsulari 3-cocco lignoso tarde dehiscente.

260. *CICCA* (EMBLICA) *ALBIZZOIDES*, nov. sp.

Arbor elegans, 25—30-pedalis, novellis puberulis; folia oblonga, inferiora elliptica v. suborbicularia, subsessilia, basi rotundata, usque ad poll. longa et  $\frac{1}{2}$  poll. lata, retusa v. obtusa, chartacea, glabra, subtus glaucescentia; flores minuti, flavescentes, glabri, pedicello glabro gracili suffulti, feminei subsessiles, secus ramulos novellos pubescentes glomerati et racemum interruptum subaphyllum efformantes; calycis lobi obovato-lineares, columna staminalis longiuscula et gracilis; styli 3, basi connati, 2-fidi, lobulis latiusculis integrisque; capsulae drupaceae iis *C. Emblicae* conformes sed duplo majores, sessiles, in vivo plus quam poll. in diametro, globosae, aqueo-albi et nervosae, pericarpio carnoso acidissimo.—Pegu.

261. *CICCA* (EMBLICA) *MACROCARPA*, nov. sp.

Arbustula 20—25-pedalis, habitu *C. Emblicae*, sed cortice aspero fesso rugoso insignis, ramulis puberulis; folia anguste lincaria, subsessilia, acuta v. obtusiuscula, basi rotundata, coriacea, marginibus subreflexis,  $\frac{1}{2}$ — $\frac{3}{4}$  poll. longa, glauco-viridia, glabra; flores lutescentes, pedicellis filiformibus suffulti, secus ramulos novellos breves aphyllus fasciculati et racemum compactiusculum usque poll. longum canescenti-pubescentem efformantes; calyx glaber, 6-partitus, lobis obovato-oblongis; columna staminalis gracilis, styli 3, basi breviter connati, robusti, 2-lobi, lobulis latis et brevibus 3-crenulatis; capsulae drupaceae cum iis *C. albizzoidis* exacte congruunt—Prome, Pegu.—*C. Emblicae* arcte affinis, sed differt cortice, stylorum lobis et capsulis duplo majoribus.

262. *APOROSA* *VILLOSULA*, nov. sp.

Arbor sempervirens, 25—30-pedalis, novellis parce pubescentibus mox glabrescentibus; folia oblonga ad elliptico- et obovato-oblonga, basi obtusa v. acuta, petiolo apice incrassato  $\frac{1}{2}$ — $\frac{3}{4}$  glabro suffulta, breviter et obtusiuscule acuminata v. apiculata, integra v. subintegra, 3—5 poll. longa, rigide chartacea v. subcoriacea, glabra, in sicco fuscescentia et nitentia; flores minuti (masculi desunt), feminei sessiles, bracteis latis obtusiusculis glabris ciliolatis dense imbricatis protecti et spicas amentaceas breves usque semipollicem longas binas v. per plures glomeratas axillares v. supra foliorum delapsorum cicatricibus orientes efformantes; ovarium dense fulvo-villosum, stigmatibus laevibus brevibus recurvis breviter bilobis terminatum; baccae aurantiacae, ovoideae, pisi majoris magnitudine, apiculatae, parce hirsutulae v. passim subglabrae, 2—1-loculares.—Pegu, Martaban, Tenasserim, Andamans.—*A. Roxburghiana* nimis affinis.—N. B. *Antidesma lunatum*, Miq. = *Aporosa lunatum*, mihi; hic planta cl. Maingay No. 1416 et Wall. Cat. 5975, sub nomine "*Cynometra* fide Benthani."

263. *HYMENOCARDIA* *FLICATA*, nov. sp. (*Coccoceras plicatum*, Muell. Arg.?)

*Arbor decidua, novellis ferrugineo-puberulis*; folia oblonga et elliptico-ad obovato-oblonga, petiolo poll. longo v. paulum longiore puberulo suffulta, basi 3-nervia rotundata v. subcordata et sæpius subattenuata, breviter et abrupte obtusiuscule acuminata, crenato-repanda, 3—5 poll. longa, chartacea, subtus secus nervos puberula et dense lutescenti- v. rubescenti-glandulosa; flores dioici, masc. pedicello brevissimo puberulo, glomerati, feminei sessiles, in racemos elongatos axillares v. supra foliorum delapsorum cicatricibus egredientes dum juvenilia amentaceos collecti; calyx masc. in alabastro globosus, subglaber; stamina numerosa, libera; ovarium dimerum, compressum, dense glanduloso-punctatum, transverse rugoso-plicatum, stylis 2 brevibus magnis dense papilloso-villosis terminatum; capsulæ desiderantur.—Pegu, Martaban, Tenasserim (Helf. 4963).—Inter plantam meam et eam cl. Muell. Arg. ex descriptione discrimen nullum adest nisi ovarium dimerum, nec alato 3-gonum. *Mallotus Wallichianus*, Muell. Arg. ex Ava, a me non visa, nulla nota differe videtur. *Hymenocardia*, ovulis solitariis nec binis gaudens, a *Coccocerate* imprimis seminibus compressis et testæ textura differt. Numerus coccorum in *Coccocerate* variat 2—4 (et probabiliter usque 5).

264. *CYCLOSTEMON EGLANDULOSUM* (*Hopea eglandulosa*, Roxb. Fl. Ind. II. 611).

*Arbor mediocris, 40—50-pedalis, glabra*; folia subobliqua, ovato-oblonga v. ovato-lanceolata, basi acuta v. obtusa, petiolo 2—3 lin. longo gracili suffulta, integra, obtusiuscule acuminata,  $1\frac{1}{2}$ —2 poll. longa, tenui-coriacea, eleganter reticulata, glabra; flores masculi glabri, feminei puberuli, c. 3 lin. in diametro, pedicello puberulo c.  $\frac{1}{2}$  pollicari suffulti, solitarii v. raro bini et axillares; ovarium fulvo-velutino-pubescent, 2-loculare; stigmata sessilia glabra, dilatato-3-angularia, crenata; drupæ desunt.—Arracan (etiam in montibus Bengalæ orientalis).

265. *CYCLOSTEMON SUBSESSILE*, nov. sp.

*Arbuscula 25—30-pedalis, glabra*; folia oblonga ad elliptico-oblonga, basi subinæqualia, obtusiuscule et sæpius subabrupte acuminata, 4—6 poll. longa, chartacea, integra v. undulata v. obsolete crenata, glabra, laxè reticulata; flores parvi, pedicello vix  $\frac{1}{2}$  lin. longo canescenti-pubescente suffulti, glomerati, axillares, calycis lobi concavo-orbiculares, extus canescenti-pubescentes, lineam circiter longi; drupæ ovoideo-oblongæ, obsolete 4-lobæ, c.  $\frac{3}{4}$ —1 poll. longæ, pedunculo usque ad 1 lin. longo suffultæ, aurantiacæ, dense fulvo-puberulæ, 2-loculares et 2-spermæ, stigmatibus 2 v. raro 3 obtusiusculis minutis sessilibus coronatæ.—Martaban (etiam in montibus Khasyanis).

266. *HEMICYCLIA ANDAMANICA*, Kurz in And. Rep. 1870, p. 47.

*Arbor 40—50-pedalis, glabra*; folia ovato-oblonga v. oblongo-lanceolata, basi rotundata inæqualia, petiolo parce pubescente glabrescente 2—3 lin. longo suffulta, caudato-acuminata, obsolete repando-serrata, rigidiuscule chartacea,



3—3½ poll. longa, eleganter reticulata, glabra; flores majusculi, pedicello minute appresse-hirsuto 1—1½ lin. longo suffulti, solitarii v. bini, axillares: calyx appresse puberulus, lobis concavo-rotundatis, 2 interioribus tenuioribus c. 2 lin. longis; stamina numerosa; drupæ pedunculo vulgo deflexo crasso 2—3 lin. longo, obverse ovoideæ, plus quam semipollicem longæ, teretes, læves, putamine semiterete, tenui-coriaceo.—Andamans. (Helfer 4962, mas).

267. *BRIEDELIA AMENA*, Wall. ap. Voigt. Hort. Calc. 157.

Arbuscula 15—25-pedalis, glabra; folia elliptica ad obovato-elliptica, petiolo lævi 2 lin. longo, basi obtusa, 2½—4 poll. longa, obtusa v. rotundata tenui-chartacea, glabra, subtus subglaucescentia, nervis lateralibus et reticulatione exiguis; flores glabri, masculi flavescentes, multo minores, feminei brevi-pedicellati, dense glomerati, rubri, axillares; calyx fem. glaber, lobis lanceolatis subulato-acuminatis, lin. fere longis: petala minuta, obovato-oblonga, rosea; discus orbicularis, sublobatus; drupæ globosæ, pisi magnitudine, succulentæ, atropurpureæ, læves.—Burma. Genus *Briedelia* a *Lebidieropside* differt coccis inter se non connatis et seminum testa membranacea sicca. Drupa in *Lebidieropside* epicarpio carnoso gaudet, cocci lignosi connati et semina tegumento exteriori succoso-carnoso circumdata sunt.

268. *BRIEDELIA PUBESCENS*, nov. sp.

Arbuscula 20—30-pedalis, novellis pubescentibus; folia elliptico-ad obovato-oblonga, basi rotundata v. obtusa, petiolo c. 2 lin. longo pubescente, breviter et abrupte acuminata v. apiculata, tenui-chartacea, integra, supra glabra v. subglabra, subtus fulvescenti-pubescentia; flores parvi, albi, pedicello brevi pubescente suffulti, glomerati, axillares; calyx dense puberulus, lobis lanceolatis c. 1 lin. longis, petala obovata, truncata et 3-denticulata, discus magnus, orbicularis, aureus; drupæ desunt.—Pegu.—Habitus omnino *B. Moonii*, Thw.

269. *BRIEDELIA DASYCALYX*, nov. sp.

Frutex magnus scandens, novellis fulvo-pubescentibus; folia obovata ad obovato-oblonga, basi obtusa, petiolo crassiusculo c. 2 lin. longo suffulta, breviter acuminata apiculata v. obtusiuscula, 2—6 poll. longa, obsolete repanda, chartacea, supra glabrescentia, subtus subglaucescentia et parce pubescentia, nervis venisque valde prominentibus; flores parvi, fulvo-tomentella, sessiles, numerosi, in glomeros densos tomentosos axillares collecti et sæpius in racemum terminalem reducto-foliatum transformati; calyx extus dense fulvo-pubescent, c. 2 lin. in diametro, lobis sub fructu lin. longis lanceolatis acutis; discus orbicularis, lævis, in centro annulo setoso drupæ basin cingente auctus; petala obovato-linearia; drupæ ovoideo-ellipticæ, pisi magnitudine, læves, atropurpureæ, succulentæ, calyce non accrescente suffultæ. Var.  $\alpha$ . genuina, frutex scandens, folia multo majora et texturæ tenuiora, acuminata. Var.  $\beta$ . aridicola, frutex minor et erectus, folia minora, usque

ad 3 poll. longa et subcoriacea, obtusiuscula v. obtusa.—Var. *a.* Ava, Prome, Pegu; var. *β.* Prome.—Ex affinitate *B. stipularis*, Bl.

270. *CLEISTANTHUS STENOPHYLLUS*, nov. sp.

Arbor v. frutex ? glaber; folia lineari-lanceolata, basi acuta, petiolo 2 lin. longo, longe subulato-acuminata, 3—4 poll. longa, chartacea, integra, glabra subtus subpallida; flores minuti sessiles, pauci glomerati, axillares; bractæ ciliatæ; calyx extus parce appresse pubescens; ovarium glabrum, sessile; capsulæ desunt.—Tenasserim v. Andamans (Helf. 4875).—N. B. *Nanopetalum*, Hassk. ad *Cleistanthum* certissime reducendum est.

271. *CROTON ROBUSTUS*, nov. sp.

Arbuscula robusta, 15—25-pedalis, novellis denso ferrugineo-lepidotis; folia elliptica v. elliptico-oblonga, petiolo crasso ferrugineo-lepidoto usque pollicem longo suffulta, basi biglandulosa obtusa v. acuta, 1½—2 poll. longa, obtusa v. obtusiuscula cum v. absque mucrone, raro subretusa, coriacea, obsolete repanda v. integra, subtus parce ferrugineo v. lutescenti-lepidota et glabrescentia, nervis lateralibus tenuibus vix conspicuis; flores parvi, masculi brevi-pedicellati canescenti-villoso-lepidoti, fuminei subsessiles, majores ferrugineo-lepidoti racemos breviores spiciformes formantes, rachi canescenti v. ferrugineo-tomentoso-lepidota et sulcata; calyx tomentoso-lepidotus; styli 2-fidi; ovarium dense cupreo-lepidotum; capsulæ globoso-ovoides, 3-coccae, 6-sulcatæ, pisi majoris magnitudine, fulvo-argenteæ, obsolete lepidoto-tuberculatæ; semina 3 lin. fere longa, 3-angulari-oblonga, lævia, brunnea.—Pegu, Tenasserim.—Ex affinitate *C. argyrate*, Bl. (syn. *C. bicolor*, Roxb.).

272. *CROTON CALOCOCCUS*, nov. sp.

Fruticulus stellato-hirsutulus; folia elliptico-ovata v. ovata, basi biglandulosâ rotundata, petiolo gracili 3—4-lin. longo stellato-aspero suffulta, breviter acuminata, repando-serrulata, raro subintegra, 1—2 poll. longa, membranacea, flavescenti viridia, subtus stellato-pubescentia, supra stellato-aspera; bractæ minutæ, subulatæ, hirsutæ; flores graciliter pedicellati, racemos graciles pubescentes terminales formantes; calyx hispidus, lobis sub fructu c. 1½ lin. longis lanceolatis; capsulæ pisi magnitudine, profunde et subdivaricato 3-lobæ et 3-coccae, tuberculis pilis hispidis radiantibus terminatis obtectæ; semina lævia, brunnea.—Pegu, Rangoon.—Species elegans, *C. Tiglii* habitu, nulli arcte affinis.

273. *CROTON FLOCCULOSUS* nov. sp.

Arbuscula, novellis dense sed fugaciter albo- v. flavescenti-stellato-tomentosis; folia cordato-ovata, basi biglandulosâ 5-nerviâ cordata v. rotundata, 1½—3 poll. longa et fere æquilata, obtusiuscule et subabrupte acuminata v. apiculata, crenata v. crenato-serrata (in serraturis glandulosa v. eglandulosa), membranacea, juniora subtus dense stellato floccosa, dein utrinque v. supra tantum glabrescentia; flores.....pedicellati, in racemos terminales dispositi; capsulæ nutantes, pisi magni magnitudine, subglobosæ et obsolete 3-angulari-

res, crustaceæ, dense et molliter canescenti-stellato-tomentosæ; semina c. 2 lin. longa, elliptico-oblonga, dorso convexo lævia.—Pegu, Prome.—*C. caudato* affinis.

274. *CROTON SUBLYRATUS*, nov. sp.

Frutex deciduus, 5—8-pedalis, novellis ferrugineo-furfuraceis; folia obovato-ad sublyrato-oblonga, basi stipitato-biglandulosâ attenuatâ rotundata v. subcordata, petiolo  $\frac{1}{2}$ — $\frac{1}{3}$  pollicari stellato-furfuraceo suffulta, obtusa v. obtusiuscule acuminata, 3—5-poll. longa, argute repando-serrulata, membranacea, adulta glabra v. subtus secus nervos stellato-aspera: flores parvi, pedicellati, stellato-tomentosa, racemum ferrugineo- v. fulvo-stellato-tomentosum ramulo- novellos terminantem formantes; sepalâ lato-lanceolata, acuta, extus fulvo-pubescentia; petalâ marginibus ciliato-pubescentia; torus pilosus; stamina c. 15—20, glabra; petalâ in fl. fem. nulla; ovarium dense fulvo-stellato-tomentosum, stigmatibus brevibus; capsulæ parvæ, pisi minoris magnitudine, 3-cocæ, subglobosæ, crustaceæ, lœves, parce appresse-stellato-hirtæ; semina 2 lin. fere longa, albido- et brunneo-variegata, lævia.—Andamans.—*C. Tiglio* quodammodo affinis.

275. *CROTON CROZOPHOROIDES*, nov. sp.

Suffrutex erectus, 1—1 $\frac{1}{2}$ -pedalis, dense stellato-tomentosus; folia ovali-oblonga v. ovalia, basi stipitato-biglandulosâ rotundata v. obtusa, petiolo  $\frac{1}{2}$ —1 $\frac{1}{2}$  pollicari stellato-tomentoso subglabrescente suffulta, obtusa v. acuta, 1 $\frac{1}{2}$ —2 poll. longa, indistincte dentato-crenata (denticulis pilis stellatis terminatis), crasse membranacea, juniora dense canescenti-stellato-tomentosa, supra granulato-aspera et subtus tomentella, nervis et reticulatione crassis et prominentibus; flores lutescentes, parvi, masculi pedicello 1—2 lin. longo (feminei brevi crasso) stellato-tomentoso suffulti, racemos longos stellato-pubescentes ramulos novellos axillares terminantes formantes; bracteæ conspicuæ, 2—3 lin. longæ, lineares, stellato-pubescentes et muriculis coccineoglandulosis ciliatæ, calyx extus dense fulvo-stellato-tomentosus, femineus major, lobis laevicolatis acutis; petalâ maris oblongo-lanceolata, marginibus albo-villosis; stamina numerosa, glabra, toro piloso inserta; ovarium dense fulvo-stellato-tomentosum, stylis coccineis, bis dichotomicè-divisis; capsulæ ovoidico-globosæ, leviter 8-lobæ, 3-cocæ, cerasi putaminis magnitudine, apice depressæ, fulvo-stellato-tomentosæ, crustaceæ.—Species pulcherrima distinctissima, habitu omnino *Julocrotonis*.—Prome.

276. *CÆLODISCUS HIRSUTULUS*, nov. sp.

Suffrutex 1—2-pedalis, simplex, ramulis junioribus compressis hirsutis; folia opposita, suborbicularia, 5—6 poll. longa et subæquilata, basi 7-nerviâ subobsolete maculatâ cordata, petiolo  $\frac{1}{2}$ —1 ped. fere longo pubescente suffulta, brevissime et obtusiuscule acuminata, subintegra v. obsolete repando-dentata, chartacea, utrinque sparse sed longe hispida, subtus prominenter et crasse nervosa, glabrescentia et parce aureo-glandulosa; spicæ masculæ densæ

et breves, usque  $\frac{1}{2}$  pollicares, sessiles, fulvo-tomentellæ, axillares; bracteæ sublineares, calyce paulo longiores; calyx maris plusquam lin. in diametro, fulvo-tomentellus, in alabastro globosus; sepala 3, lato concavo-ovata; stamina numerosissima, glabra; flores feminei et capsulæ ignotæ.—Pegu, Prome.—Cœlodiscus melius species omnes Malloti includit quæ alabastro apiculato et seminibus carunculis gaudent. Genus tali modo reformatum, characteribus stabilibus ornatum, magis naturale evadit, et inter alia *Mallotum eriocarpoidem, eriocarpum, lappaceum, longipedem et disparem* recipit.

277. *CLAOXYLON LONGIPETIOLATUM*, nov. sp.

Frutex subsimplex v. arbusculi, 8—15-pedalis, caulibus fistulosis et novellis appresse pubescentibus, folia elliptica ad ovato-oblonga, basi acuta v. obtusa, v. raro subcordata, petiolo 5—3 poll. longo suffulta, breviter et tenuiter acuminata, 4—8 poll. longa, crasse membranacea, undulato-crenata v. crenato-dentata, penninervia, utrinque scabra, subtus secus nervos parce appresse pubescentia; flores parvi, masculi racemos nutantes canescentes appresse hispidos formantes; capsula (unica tantum adest in montibus Khasya a cl. Hookero et Thomsonio collecta et a speciminibus ipsis separata) iis *Malloti eriocarpoidi* nimis affinis, profunde 3-loba, muricibus hirsutis obtecta, stylis simplicibus papilloso-fimbriatis coronata, 3-cocca, coccis pisi magnitudine.—Pegu, Martaban.—*C. longifolio* affinis.

278. *CLAOXYLON LEUCOCARPUM*, nov. sp.

Fruticulus 3—4-pedalis, caulibus fistulosis, novellis stellato-pubescentibus; folia ampla, lato-ovata, basi rotundata v. subcordata, petiolo puberulo glabrescente 3—8 pollicari suffulta, pedem circiter longo et fere æquilata, basi crasse 3- v. sub-5-nervia, breviter et obtusiuscule acuminata, repando-dentata, membranacea, supra stellato-aspera, subtus stellato-puberula, nervis venisque transversis crassis et prominentibus percursa; flores desunt, feminei breviter-pedicellati, racemos breves stellato-tomentosos axillares efformantes; calyx stellato-tomentosus, inæquali-2-sepalus; ovarium dense muricatum, stellato-hispidum; capsulæ pedunculo puberulo 2—3 lin. longo crasso suffulta, cerasi minoris magnitudine, 3- v. raro 4- v. 2-cocca et -lobæ, stylis crassis papilloso-fimbriatis coronatæ, dense muricati (muricibus stellato-hispidis), albæ, carnosæ-coriacæ; semina subgloboso-ovoidea, lævia, pisi minoris magnitudine, arillo niveo succulento omnino inclusa.—Pegu.

279. *TRAGIA BURMANICA*, nov. sp.

Frutex volubilis, novellis appresse puberulis; folia larga, cordato-ovata, petiolo 1—3 pollicari canescenti-appresse-puberulo suffulta, basi 5-nervia sinuato-cordata, breviter et abrupte acuminata, tenui-chartacea, remoto denticulata v. subintegra, 2—5 poll. longa, supra sparsæ albo-setulosa, flores desunt; pedunculi solitarii, graciles, 2—3 poll. longi, puberuli, e ramulis novellis axillaribus egredientes; calycis lobi sub fructu lato-ovati, foliaci, acuti, pollicem fere longi, extus sparsius, intus dense appresse setosi; capsulæ 3-

coccæ, coccis pisi majoris magnitudine, longe et rigide appresse hirsutæ, lignosæ, calyce aucto 6-foliolato sustentæ; semina globosa, velutinæ, pulcherrime atrobrunneo-tigrinæ.—Martaban.

#### BLUMEODENDRON nov. g.

Flores dioici. Calyx maris valvatus, 3-partitus. Petala nulla. Discus maris glandiformis. Stamina numerosa, libera, receptaculo centrali elevato inserta. Ovarii rudimentum nullum. Ovarium 3-loculare, ovulis solitariis. Capsula magna, fibroso-carnoso, 3-cocca. Semina magna, arillo spurio crasso involuta. Albumen saponaceum. Cotyledones foliacei, sub-orbiculares; radicula brevis.—Arbores, foliis oppositis et ut plurimum verticillatis, simplicibus, petiolis incrassato-articulatis. Flores mediocres, pedicellati, breviter racemosi, racemis fasciculatis axillaribus.

Genus a cl. Muell. Arg. cum *Malloto* incaute conjunctum.

280. BLUMEODENDRON TOKBRAI, (*Mallotus Tokbrai*, Muell. Arg. in DC. Prod. XV/2 956.) Etiam in insulis Andamanicis occurrit.

Altera species, sub nomine *Paracrotonis penduli* in Horto Bogoriensi culta et sub eodem nomine a cl. Muell. Arg. in Prodromo annotata, nomine *Bl. Muelleri* saluto. Folia sunt minora, textura tenuioris et subtus lævia. —*Paracroton pendulus*, Miq., mihi ignota est, sed jam racemis 3—4½-pedibus capsulisque tomentosis totoculo differt.

N. B. *Mallotus albus*, Muell. Arg. = *M. tetracoccus* (*Rottlera tetracocca*, Roxb. H. Ind. III. 826.)—*Rottlera alba*, Roxb. cum *Malloto paniculato*, Muell. Arg. conjungenda est.

281. CLEIDION NITIDUM, Thw. MS.

Arbuscula glaberrima; folia lato-ad elliptico-lanceolata, petiolo 2—3 lin. longo (in speciminibus Ceylonicis longiore) crasso suffulta, utrinque acuminata, a medio repando-dentata, 2—3½ poll. longa, tenui-coriacea, glabra, in sicco fusciscentia; flores masculi parvi, glabri, sessiles, pauci, glomerati, spicam glabram v. indistincte puberulam elongatam oppositifoliam terminalem efficientes; calyx glaber, in alabastro globosus; flores aperti etc. ignoti.—Andamans.

282. MACARANGA MOLLIUSCULA, nov. sp.

Arbor mediocris, novellis molli-pubescentibus; stipulæ magnæ, lineari-oblongæ, acuminatæ; folia magis minusve orbiculari-ovata, petiolo 3—4 pollicari glabrescente glaucescente suffulta, basi multinerviâ lato-cordata, ½—1½ ped. in diametro, sinuato-denticulata, breviter acuminata, membranacea v. submembranacea, supra molli-puberula v. subglabra, subtus dense puberula et luteo-glandulosa, raro glabrescentia; flores parvi, masculi et feminei sessiles, illi glomerati bractea foliaceâ 2—4 lin. longâ lato-ovali v. ovatâ acuminatâ dentatâ v. pectinatâ protecti et paniculam axillarem pedunculatam subgracilem puberulam efficientes; feminei solitarii bractea cuneato-oblongâ

sæpius 3-lobâ serrato-dentatâ v. fimbriatâ foliaceâ tomentellâ c.  $\frac{1}{4}$ — $\frac{1}{2}$  pollicari subtenti, spicas simplices interruptas puberulas formantes; antheræ 5—6; ovarium appresse hispidulum, 2-loculare; styli 2, subulati; capsulæ desunt. Andamans (Helf. 4722).—

N. B. *M. gummiiflua*, Muell. Arg. = *M. denticulata*, Muell. Arg.

283. *MACABANGA MEMBRANACEA*, nov. sp.

Frutex sursum ramosus, 2—4-pedalis, novellis puberulis, ramulis glabrescentibus et glaucescenti-fuscis; folia ovata v. suboblongo-ovata, non peltata, basi 3-nerviâ subtruncata v. subsinuato-rotundata, petiolo gracili 1—3 poll. longo puberulo suffulta, 2—4 poll. longa, simplicia v. passim in lobos 2 v. 1 laterales longe acuminatos producta, remote callosa-dentata, longissime et tenuiter acuminata, juniora utrinque rubescenti-glandulosa et subvelutina, v. supra glabrescentia; flores masculi, ignoti, feminei sessiles, solitarii bini v. terni, bracteâ foliaceâ  $\frac{1}{2}$ — $\frac{3}{4}$  pollicari ovatâ acuminatâ laccerato-dentatâ puberulâ et glandulosâ subtenti et in capitulum involucreatum pedunculo 1—3 poll. longo pubescente axillari suffultum collecti; calyx urceolatus, limbo tubulari styli basin amplexente, ovarium rubicundo-glandulosum et hirsutum, styli 2,  $\frac{1}{2}$  poll. longi, filiformes, glabri; capsulæ 2-coccæ et 2-lobæ, coccis pisi minoris magnitudine, rubicundo-glandulosopulverulentæ et muricibus filiformibus glabris sparsis obtectæ; semina globosa, brunnea, lævia.—Ava, Martaban.—*M. involucreatæ* affinis.

284. *CODILEUM ANDAMANICUM*, nov. sp.

Frutex magnus, glaber; folia obovato-oblonga ad elliptica, basi acuta v. obtusa, petiolo 3—10 lin. longo, breviter et obtusiuscule acuminata, 3—6 poll. longa, pergamacea, integra, glabra; flores parvi, masculi pedicello capillari 3—4 lin. longo suffulti et racemum umbelli- v. corymbi-formem formantes, feminei paulo majores, pedicello brevissimo crasso supportati et corymbulum subsessilem ramulos novellos sæpius axillares terminantem efficientes; calycis lobi rotundati, glabri, ii fl. fem. ovati, acuti; petala in mare parva; glandulæ hypogynæ magnæ, trigono-truncatæ, cænosæ; stamina in seriebus pluribus; ovarium appresse hirsutum, stylis 3 longissimis profunde bifidis, capsulæ pedunculo nutante brevi sursum incrassato suffultæ, globoso-3-coccæ, cerasi minoris magnitudine, indistincte scabriusculæ, lignoso-coriacæ; semina ovoideo-elliptica, holosericeo-canescientia, variegata.—Andamans.—*C. umbellato*, Muell. Arg. affinis.

285. *CODILEUM* ? *LUTESCENS*, nov. sp.

Frutex dioicus?, 8—12-pedalis, novellis sparse puberulis; folia lanceolata, passim subfalcata, basi acuminata, petiolo 2—3 lin. longo puberulo glabrescente suffulta, obtusiuscule acuminata, pergamacea, glabra, penninervia, in sicco flavescentia; flores masculi minuti, pedicello capillari 2—3 lin. longo suffulti, umbellati, umbellis pedunculo puberulo  $\frac{1}{2}$ — $\frac{3}{4}$  pollicari apice capitato-bracteato solitario axillari suffultis; calyx 3-partitus, leviter imbri-

catus, lobis ovato-lanceolatis, c.  $\frac{1}{2}$  lin. longis, acutis, extus appresse hispidulis; stamina c. 8—12 circa centrum læve luteum disci latiusculi continui inserta petala nulla; flores feminei etc. ignoti.—*Andamans.*

286. *EXCÆCARIA HOLOPHYLLA*, nov. sp.

Arbor sempervirens, glaberrima; folia alterna, oblonga ad lato-lanceolata, basi acuta v. obtusa, petiolo 3—4 lin. longo suffulta, obtusiuscule acuminata, pergamacea, integerrima, 3—6 poll. longa, nervis lateralibus curvis tenuibus; flores parvi, sessiles, masculi 3-ni v. plures, feminei basilares solitarii, bracteis brevibus latis (magnæ glandulæ utrinque insertis) protecti et racemum spiciformem oppositifolium terminalem glabrum formantes; flores masculi 2—3-andri; baccæ ignotæ — Martaban, Tenasserim — *E. oppositifoliæ* affinis, sed foliis integerrimis alternis statim distinguenda.

287. *EUPHORBIA SCABRIFOLIA*, nov. sp.

Herba annua, subsimplex, gracilis, 1—2-pedalis, ramis glabris in sicco sulcatis; stipulæ breves et angustæ, parce et rigide fimbriatæ; folia linearia v. elongato-lineari-oblonga, brevissime petiolata v. subsessilia, basi inæquali rotundata v. obtusa, 1—2 poll. longa, mucronato-acuta, cartilagineo-serrulata, crasse membranacea, supra glabra, subtus sparse crispato-pilosula, 1-nervis, nervis lateralibus nullis, glauco-viridia; capitula subsessilia, in cymas glomeriformes subsessiles axillares v. spurie terminales collecti, v. sæpe bina v. solitaria; involucrium campanulatum, breve, extus puberulum, fauce villosum, fimbriatum, glandulis in appendicem obovato-cuneatum laceratum album plus quam lin. longum expansis; ovarium canescenti-pilosulum; styli graciles, 2-lobulati; capsulæ 3-coecæ, parce crispato-pilosulæ, c. 2-lin. in diametro, coecis compresso-acutis dorso nudis; semina obsolete 3-gono-oblonga, sordide aurantiaca, opaca, lævia.—Prome, Pegu.—Ex affinitate *E. noloptera*, Boiss.

288. *EUPHORBIA EPIPHYLLOIDES*, Kurz in And. Rep. ed 2. 48.

Arbuseula 15—12-pedalis, carnosa, glabra, inermis, ramis complanatis crasse alatis, crenato-sinuatis, ad articulationes attenuatis et teretibus; stipulæ obsoletæ; folia obovalia, brevissime petiolata, basi obtusa, glabra, carnosa, nitentia, rotundata v. subretusa, nervis lateralibus obsoletis; capitula in cymulas dichotomas brevipedunculatas glabras e sinibus crenaturarum ramorum egredientes disposita; capsulæ profunde trilobæ, glabræ, iis *E. ligulariæ* consimilia.—*Andamans.*

## URTICACEÆ.

### BALANOSTREBLUS, nov. gen. Pl. XIX.

Flores monoici; masculi ignoti (ex inflorescentiis valde juvenilibus probabiliter amentacei?). Feminei racemosi: perianthium cum ovario connatum, sursum liberum et ovarium omnino includens, apice perforatum. Ovarium semisuperum, 1-ovulatum, ovulo pendulo; stylus perbrevis, e pe-

rianthii orificio protrudens; stigmata 2, brevia, crassa, villosula. Drupa perianthio carnosio inclusa, monosperma. Arbor lactescens, subglabra, foliis alternis grosse spinescenti-dentatis. Genus imperfecte cognitum sed distinctissimum *Antiar* affine

289. *BALANOSTREBLUS ILICIFOLIUS*, nov. sp.

Arbor ramulis scabriusculè puberulis; folia elliptica ad lato-ovalia, petiolo terete 1—2 lin. longo glabro suffulta, basi sæpius subinæquali acuta v. obtusa, rigide coriacea, spinoso-acuta, grosse spinoso-dentata, 1—3 poll. longa, glabra, supra nitida costa supra immersa subtus unacum nervis lateralibus arcuato anastomosantibus valde prominente; flores parvi, viridiusculi, pedicello brevi crasso suffulti, in racemum axillarem brevem collecti; perianthium obturbinatum, rugulose-tuberculatum, c. 2 lin. longum; drupæ pisi minoris magnitudine, rubræ, rugulosæ, carnosæ, glabræ.—*Chittagong* (Hf. et Th. sub Sapii sp. No. 4); *Ava* (J. Anderson).

*MUSACEÆ.*

290. *MUSA RUBRA*, Wall. ap. Voigt Cat. Hort. Calc. 579, non hort.; Kurz in Journ. Agr. Hort. Soc. Beng. XIV. 301.

Humilis, cæspitosa, caudicibus pollicem vix crassis viridibus; folia oblonga basi subrotundata glabra, petiolis brevibus foliaceo-marginatis; spathæ saltem apice imbricatæ deciduæ ovales obtusæ rubræ pruinosulæ 5—6-floræ; flores aurantiaci, labio pumilo; fructus crasse truncato-rostrati lutei glabri; senuina depresso-turbinata lævia.—*Pegu, Martaban.*

*LILLIACEÆ.*

291. *DRACENA HELFERIANA*, Wall. MS. (*Cordyline Helferiana*, T. And. Cat. Hort. Calc. 72.)

Suffrutex parvus, decumbens, simplex v. vix ramosus, glaber, 1—2-pedalis, caudice basi radicante 3—4 lin. crasso; folia approximata, obversæ lanceolato-oblonga, sessilia et basi dilatata, v. in petiolum lato-foliaceum longiorem v. breviorē vaginantem subattenuata, acuta v. breviter acuminata, 1—1½ ped. longa et 1½—2 poll. lata, subundulata, tenui-coriacea, costa apicem versus subevanescente, venis in sieco tenuibus sed prominentibus; flores albi v. in colorem purpurascentem vergentes, tubo viridiusculo, poll. longi, pedicello gracili basin versus articulato suffulti 2—3-ni fasciculati, secundi et paniculam parce divaricato-ramosam terminalem amplam glabram efficientes; bracteæ lineari-lanceolatæ, eæ ramificationum inferiorum usque ad pollicem longæ, deciduæ; bracteolæ ovato-lanceolatæ, minutæ; perianthium basi inflatum et fere usque ad basin 6-partitum, lobis linearibus obtusis tubuloso-convergentibus apice tantum patentibus; filamenta alba; baccæ 1—3 lobæ, lobis subsphæricis pisi magnitudinis aurantiacis nitidis 1-spermis.—*Pegu, Martaban, Tenasserim.*—*D. ternifolia* affinis.



292. *DRACÆNA PACHYPHYLLA*, nov. sp.

Fruticulus erectus v. ascendens, simplex v. vix ramosus, glaber, 1—2-pedalis, caulibus digiti minoris crassitudine v. tenuioribus; folia elliptica ad elliptico-lanceolata, acuta v. subulato-acuminata, coriacea, sæpius maculata, 4—6 poll. longa et  $1\frac{1}{2}$ — $2\frac{1}{2}$  poll. lata, costa apicem versus evanescente, venis tenuibus et prominentibus, superiora basi sensim complicato-attenuata semi-amplexicaulia, inferiora in petiolum usque ad poll. longum foliaceum basi vaginanter ampliatum abruptius contracta; flores albi, pedicello brevissimo robustiusculo articulado suffulti, racemum terminalem 1—2 pollicarem spiciformem pedunculatum glabrum efficientes; perianthium c.  $\frac{3}{4}$  poll. longum rectum, basi parum inflatum, fere usque ad basin 6-fidum, lobis erectis et tubiformi-conniventibus apice tantum erecto-patentibus; baccæ 3—1-lobæ, lobis globosis pisi magnitudine rubris nitentibus monospermis.—*Andamans.* (etiam *Malacca*, Maingay No. 1684). A *D. spicata*, specie arborea, quæ cum cl. Baker conjunxit, statura humili et perianthio recto non torto jam differt. *D. Finlaysoni*, Baker, eadem est ac *D. linearifolia*, Miq.

293. *DRACÆNA BRACHYPHYLLA*, nov. sp.

Fruticulus gracilis, parce ramosus, glaber caulibus 2—4 lin. crassis, folia linearia, sessilia basi breve petioliformi-attenuata et lato-amplexicaulia;  $\frac{1}{2}$ —1-pedalia, acuminata, tenui-chartacea, costâ apicem versus evanescente venisque tenuissimis et prominentibus; flores  $\frac{1}{2}$ — $\frac{3}{4}$  poll. longi, albi, pedicello supra medio articulado 2—3 lin. longo suffulti, bini v. solitarii, in racemos breves strictiusculos dispositi et paniculam terminalem sessilem brevem erectam glabram formantes; bracteæ lineari-lanceolatæ, subulato-acuminatæ, inferiores usque ad  $\frac{1}{2}$  poll. longæ; bracteolæ ovatæ, acutæ, membranaceæ, scarioso-marginatæ, c. lin. longæ; perianthium fere ad basin 6-fidæ, lobis tubuloso-conniventibus et apice erecto-patentibus; filamenta alba; baccæ.—*Andamans.*—*D. angustifoliæ* affinis.

• *GRAMINEÆ.*

294. *ARUNDINARIA ELEGANS*, nov. sp.

Fruticosa, 6—15-pedalis, culmis digit-crassis; folia linearia, longe acuminata, brevissime petiolata, rigide chartacea, 4—5 poll. longa,  $\frac{1}{2}$ — $\frac{3}{4}$  poll. lata, subtus conspicue tessellata et, præsertim apicem versus, secus margines cartilagineas subspinuloso-scabra; foliorum vaginæ glabræ, ore truncato parce hirsuto; turionum vaginæ parce fulvo-hispidulæ, ore nudo attenuato minute auriculatæ; spiculæ pedicello gracili  $\frac{1}{2}$ —1 poll. longo suffultæ,  $1\frac{1}{2}$ — $\frac{3}{4}$  poll. longæ, 14—4-floræ, racemum terminalem paniculiformem angustum glabrum efficientes; glumæ 2, 3— $3\frac{1}{2}$  lin. longæ, superior paulo brevior; rachillæ c. 2 lin. longæ, sericeo-puberulæ, nodo barbatæ; valvula exterior c. 4 lin. longa, compresso-concava, lanceolata, cuspidato-acuminata, lævis; valvula interior paulum brevior compresso-navicularis, secus carinas apicem versus

appresse-albido puberulis; turionum vaginæ magnæ, appresse argente-oscetulosæ, ore subtruncatæ; lamina imperfecta extus appresse sericeo-setulosa, basi in auriculas falcato-oblongas setoso-fimbriatas decurrens; folia lineari-lanceolata, basi truncata sæpius subobliqua, breviter (1 lin.) petiolata (superiora u. bæssilia), 4—8 poll. longa,  $\frac{1}{2}$ —1 poll. lata, acuminata, subtus scabride hirtula, marginibus scabra, nervis utrinque 5—7; vaginæ glabræ? (verosimiliter juniores hirsutæ), ore haud productæ et auricula incrassata longe (pilis 2—4 lin. longis) fimbriata terminatæ; spiculæ, etc. ignota.—*Pegu.*—ex affinitate *B. strictæ*.

298. *GIGANTOCHLOA* (*OXYTENANTHERA*) *MACROSTACHYA*, nov. sp.

Arborea, 30—50-pedalis, cæspitosa, culmis brach. crassis; turionum vaginæ brevissimæ, 5—8 poll. longæ, dense appresse nigrescenti-setosæ; lamina imperfecta in auriculas magnas undulatas rotundato-terminatas fusco-fimbriatas decurrens; lingula angustissima, integra v. obsolete dentata; folia lanceolata, basi obtusa v. subrotundata, breviter (1 lin.) petiolata, 5—7 poll. longa,  $\frac{1}{2}$ —1 poll. lata v. latiora, acuminatissima, marginibus retrorse scabra, subtus albida et molliter puberula; vaginæ patenti-hirsutæ, glabrescentes, uno latere oris paulum producti minute auriculatæ et parce sed longe (2—3 lin.) fimbriatæ; lingula inconspicua; spiculæ sessiles (raro una alterave pedunculata), 1 $\frac{1}{2}$ —2 poll. longæ, lineares, compressiuseculæ, 6—7-floræ, strictæ v. raro curvulæ, subulato-acuminatæ, laxè glomeratæ, interrupto spicatæ et sensim paniculam amplam radicalem efficientes; valvulæ exteriores omnes rigide nigrescenti-fimbriatæ, inferiores 3 v. 4 abbreviatæ et vacuæ, superiores 3 hermaphroditæ; valvula exterior fl. herm. lineari-lanceolata, convoluta, subulato-acuminata; valvula interior anguste navicularis, præsertim sursum secus angulos dorsi deplanati atropurpureo-ciliata, apice vix bilida; antheræ purpureæ, aristato-acuminatæ; ovarium cum stylo simplici longo hirsutum; stigma album.—*Martaban, Tenasserim.*—Genus *Oxytenanthera*, Munro (excepta *O. Thecitesii*) nulla nota differt a *Gigantochloa* nisi Caryopside elongata; valvula interior in omnibus speciebus a me examinatis deplanata et bicarinata evadit. *Gigantochloæ* genus valde artificiale et filamentis connatis vix ac ne vix a *Bambusa* differt. Habitus et spicularum structura in generibus *Bambusa* et *Gigantochloa* simili modo variat et species ex habitu acutissime affines, e. g. *B. polymorpha* et *Gigantochloa aspera* spiculis omnino inter se differunt.

299. *MELOCANNA HUMILIS*, nov. sp.

Fruticosa, cæspitosa, 8—15-20 pedalis, culmis  $\frac{1}{2}$ —1 poll. crassis; turionum vaginæ glabræ? brevissimæ, ore sinuato valde producto rotundatæ et ampliatæ; lamina imperfecta linearis, erecta, basi in marginem polito-viridem angustum decurrens; lingula angustissima, integra; folia lanceolata ad lineari-lanceolata, basi obtusa, petiolo 2—3 lin. longo suffulta, subulato-acuminata, 4—6 poll. longa  $\frac{1}{2}$ —1 poll. lata, secus marginem alterum scaberrima

subtus glaucescentia et scabrido-puberula; vaginæ glabræ, ore minute auriculato longe fimbriatæ; spiculæ, etc. ignota.—*Pegu, Arracan. Melocanna* a *Schizostachyo* differt caryopsidis epicarpio crasse carnoso et perigynii absentia.

300. *CEPHALOSTACHYUM FLAVESCENS*, nov. sp.

Fruticosa, cæspitosa, 10—15-pedalis, culmis poll. circiter crassis; turionum vaginæ fragiles, appresse albo-setulosæ, lamina imperfecta erecta v. suberecta, inflato-cordata, convoluto-acuminata, basi in appendices latas undulatas fimbriatas falcatas decurrens, quarum una deflexa altera sursum vergens; lingula c. 2 lin. lata, erosodentata; folia parva, linearia, 3—5 poll. longa,  $\frac{1}{3}$ — $\frac{1}{2}$  poll. lata, acuminata, basi rotundata, brevissime petiolata marginibus præsertim apicem versus scabra, cæterum glabra; vaginæ glabræ, ore vix producto minute et incrassato-auriculatæ et pauci-fimbriatæ; spiculæ cylindrico-lineares, acuminatæ, c.  $\frac{1}{2}$  poll. longæ, albo-pilosæ, 3-floræ, dense glomeratæ et interrupte spicatæ, dein sensim in paniculam radicalem amplam collectæ; valvula infima vacua, sequentes hermaphroditæ cum terminali hebetata; valvula interior et exterior fl. herm. subconformis, albo-pilosa, subulato-acuminata, illa dorso subdeplanato apicem pilosum versus bicarinata; lodiculæ 3, lanceolatæ, acuminatæ, ciliolatæ; antheræ primum viridiusculæ et purpurascenti-punctatæ, dein pallide flavæ, acutæ v. obtusæ; perigynium elongato-lageniforme, cum rostro triquetro parce pilosum; stigmata 3, brevina, albo-pilosa; pericarpium.....—*Pegu*, in H. B. C. culta.—*C. pergracili* affine.—Genus *Teinostachyum* a *Cephâlöstachyo* more *Arthrostylidii* rachillis elongatis tantum differt et, in opinione mea, rejiciendum est. *Schizostachyum Blumei* Munro, non N. E. species est nova Hindostanica, *Sch. Hindostanicum* nominanda.

301. *PSEUDOSTACHYUM COMPACTIFLORUM*, nov. sp.

Arborea, cæspitosa, semiscandens, culmis 1—1 $\frac{1}{2}$  poll. crassis; turionum vaginæ lævissimæ, lamina imperfecta in auriculam angustam reflexam lunato-productam patenter fimbriatam decurrens, lingula integra, angustissima; folia larga, oblongo-lanceolata ad lanceolata, basi oblique truncata v. obtusa, breviter (1—2 lin.) petiolata, 6—10 poll. longa, 1—2 poll. lata, subulato-acuminata, glabra, uno latere apicem versus scabra; vaginæ appresse sericeo-setosæ, mox glabrescentes, ore truncato in auriculam lunatam reflexam longo (3 lin.) fimbriatam productæ, ligula integra, angusta; spiculæ minimæ, 2—2 $\frac{1}{2}$  lin. tantum longæ, iis *Bambusæ longispathæ* consimiles, latæ et sub anthesi quasi truncato-2-lidæ, 5-floræ, dense glomeratæ et interrupte spicatæ, dein sensim in paniculam amplam radicalem collectæ; valvulæ inferiores 2 vacuæ, sequentes 2 hermaphroditæ, cum flosculo terminali longe pedicellato obovato; valvula exterior fl. herm. lato-ovalis, ventricosa, brevissime mucronata, nitens, c. 2 lin. longa; valvula interior æquilonga, latc-navicularis, apice 2-denticulata, secus angulos dorsi depressi albo-ciliata;

lodicule 3, maximæ, ovales, obtusæ, longe fimbriatæ; antheræ virescenti-luteæ, perigynium cum rostro brevi truncato glabrum; stigmata brevia, albo-plumosa; pericarpium maturum pomi feri magnitudinis, irregulari-globosum, nitens, rigide coriaceum; semen maximum, carnosum, mox germinans.—*Martaban.*

302. *PSEUDOSTACHYUM HELFERI*, nov. sp. (*Bambusa Helferi*, Munro, ?)

Subscandens, cæspitosa, arborescens, culmis poll. circiter crassis; turionum vaginæ fugacissime albido-setulosæ, lamina imperfecta patens, basi attenuata in auriculam parvam longe fimbriatam producta, lingula angustissima setis albis 2—1 lin. longis fimbriata; folia larga, oblongo-lanceolata, basi vulgo inæqualia, breviter (1—2 lin.) petiolata, acuminata,  $\frac{1}{2}$ —1 ped. longa 2—2 $\frac{1}{2}$ —3 poll. lata, juniora secus margines scabra, mox glabra, subtus glaucescentia; vaginæ apparenter glabræ, ore parum producto et uno latere minute fimbriato-auriculatæ; lingula fimbriata, fragilitate pilorum mox integra v. indistincte denticulata; spiculæ, etc. ignota.—*Pegu, Martaban.*

303. *DINOCHLOA ANDAMANICA*, nov. sp.

Alte scandens, culmis poll. circiter crassis; turionum vaginæ sparse albido-setulosæ, ore nudo rotundata et vulgo undulata; lamina imperfecta erecto-patens, supra hispidula, lingula minute denticulata, sinum oris marginans; folia larga, oblongo-lanceolata ad lanceolata, basi rotundata, brevissimè petiolata, setaceo-acuminata, 6—12 poll. longa, 1—2 poll. lata, utrinque lævia; vaginæ glabræ, ore parum producto subrotundatæ, lingula angusta, albida, os totum marginans et integra; spiculæ minutæ,  $\frac{1}{2}$ —1 lin. longæ, ovatæ, nitidæ, stramineæ, glabræ, sessiles, glomeratæ, interrupte spicatæ et in paniculam racemiformem angustam terminalem collectæ; valvula inferior saccato-cymbiformis, abbreviata, retuso-mucronata, vacua; valvula exterior fl. herm. lato-convoluta-ovata, acuta, lævis, lin. fere longa; valvula interior conformis; antheræ spurie 4-loculares, acuminatæ; ovarium etc., ignota. *Andamans (etiam in insulis Nicobaricis).*—*D. Tjangkorreh* affinis, sed spiculis multo minoribus pallidis (nec brunneis) foliis multo majoribus et ligula vaginarum differt. Specimina ex insulis Phillipinis, valvula interiore ciliata gaudentia et a cl. Munro cum *D. Tjangkorreh* conjuncta mihi est species nova et etsi eam non vidi *D. ciliatam* nomino.

304. *DINOCHLOA MACLELLANDII*, (*Bambusa Maclellandii*, Munro in Linn. Trans. XXVI. 114).

Alte scandens, culmis pollicem crassis; turionum vaginæ fugaciter appresse argenteo-setulosæ ore incrassato polito-marginatæ; ligula brevis, integra; folia magna, oblongo- ad ovato-lanceolata, basi rotundata, breviter (1—2 lin.) petiolata, subulato-acuminata,  $\frac{1}{2}$ —1 $\frac{1}{2}$  ped. longa, 1 $\frac{1}{2}$ —3 $\frac{1}{2}$  poll. lata, lævia, uno latere apicem versus retrorse scabra; vaginæ juniores appresse argenteo-setulosæ, mox glabrescentes, ore parum productæ et auricu-

la appressa rotundata nitente nuda terminatæ, lingula os totum occupans, integra; spiculæ, etc. ignota.—*Pegu, Martaban.*

### CORRIGENDA ET ADDENDA.

*Pueraria brachycarpa*, supra p. 232, dele observationem “*Spatholobus crassifolius* Bth. Diocleæ est species,” et adde :

243b. *PUERARIA STRICTA*, nov. sp.

Herba perennis erecta 2—4-pedalis, ramis subteretibus novellis canescenti-tomentosis; folia pinnatim 3-foliolata, petiolo  $1\frac{1}{2}$ —2 pollicari pubescente suffulta; foliola ovata, lateralia inæqualia, 2—3 poll. longa, acuta v. breviter acuminata chartacea utrinque sparse appresse hirsutula; flores desunt; racemi canescenti-tomentosi simplices axillares et in paniculas terminales collecti; bractæ parvæ, subulatæ, persistentes; pedicelli sub fructu c. 2 lin. longi, calyx c. lin. longus puberulus; legumina lineari-oblonga, 1— $1\frac{1}{2}$  poll. longa,  $2\frac{1}{2}$  lin. lata, plana, glabra, pallida, 7—9-sperma; semina compresso-orbicularia, nigra, c. 2 lin. lata.—*Pegu, Martaban.*

243c. *PUERARIA HIRSUTA*, nov. sp.

Herba perennis volubilis v. prostrata ramis obtuse angulatis et retrorse appresse hirsutis; folia pinnatim 3-foliolata, petiolo patenter hirsuto 2— $2\frac{1}{2}$  pollicari suffulta; foliola ovata ad ovato-lanceolata, lateralia obliqua, acuminata, chartacea,  $2\frac{1}{2}$ — $3\frac{1}{2}$  poll. longa, utrinque (præsertim subtus) sparse appresse hirsuta; flores desunt; racemi vulgo bini v. terni dense fulvo-hirsutuli, axillares; bractæ deciduæ; pedicelli sub fructu c. lin. longi; calyx parvus; legumina oblongo-v. lineari-lanceolata,  $\frac{1}{2}$ —1 poll. longa, 3— $3\frac{1}{2}$  lin. lata, plana et subtorosa, sparse sed longe et patenter hirsuta, 2—4-sperma; semina transverse ovoidea, compressa, pallida v. pallide brunnea, nitida, c.  $2\frac{1}{2}$  lin. lata.—*Pegu.*

### Explanatio tabularum.

- T. XVIII. *Gonocitrus angulatus*, Kz. Fig. 1. ramus fructiferus; f. 2. fructus; f. 3. id. longitudinaliter sectus; f. 4. id. horizontaliter sectus; f. 5. semen, magnitudine paullo auctum; f. 6. semen longitudinaliter sectum.
- T. XIX. *Balanostreblus ilicifolius*, Kz. Fig. 1. ramus florens plantæ feminæ; f. 2. ramus fructicans; f. 3. racemus florum femineorum; f. 4. flos femineus perianthio remoto ovarium exhibens; f. 5. flos femineus longitudinaliter dissectus; f. 6. fructus maturi sectio verticalis. Fig. 3—6 omnes magnitudine auctæ.

NOTES ON THE CERTHIINÆ OF INDIA,—by W. E. BROOKS, Esq., C. E.,  
Dinapore.

(Received September 8th, read November 5th, 1873.)

With a good series of about thirty to work with, it appears to me that we have decidedly five species in India.

I.—*CERTHIA HIMALAYANA*, Vigors.

A well-known species which need not be described here, and which is distinguished from the others by its well-barred tail, the other species having the tail only occasionally obscurely rayed.

II.—*CERTHIA HODGSONI*, Brooks.

The differences between this bird and the European *C. familiaris* have been already pointed out.\*

I regard the *four* outer plain or unspotted primaries of *C. Hodgsoni* *versus* the *three* plain ones of the English bird, as conclusive evidence of the distinctness of the two species. The much longer and straighter bill, with the white lower mandible; and the greyer and less rufous tone of plumage, with much whiter spotting on the back and head, should also be taken into account. The legs and feet of the English bird are also, as a rule, darker. The voices of the two birds differ; that of the English one being much louder and somewhat different in tone. The Indian species is much more silent. I have before noted the conspicuous difference in the eggs.

This species is the *C. familiaris* of some Indian ornithologists.

III.—*CERTHIA NIPALENSIS*, Hodgson.

*Certhia discolor*, Blyth.

Any one who has examined Mr. Hodgson's drawing of *C. Nipalensis*, must have seen at a glance that it represents the earthy brown breasted bird; and I have therefore no hesitation in uniting both species under Hodgson's term.

The supposition that the brown-breasted bird could be identical with either of the two species next to be described, is a great mistake, as a good series at once shews. As far as my own observation goes, the sexes of the *Certhiinae* are alike in plumage. Even the young and old are very similar. The earth-brown tint of *C. Nipalensis* commences from the base of the lower mandible; and the chin and throat, which are generally protected from getting soiled in most birds, are in this species as dark as any part of the breast. The idea that the brown lower surface is merely produced by the feathers being soiled, is against the rule with regard to Creepers, which preserve the purity of their plumage in a remarkable manner, even near large manufacturing towns. The colour on the breast of *C. Nipalensis* is, as Mr. Blyth observed, a fast colour.

\* Journ. A. S. Soc. Beng. Vol. XLI, Part II, p. 73.

The tail of this species is more rufous than that of any of the others. In other respects the colouration of the upper parts is similar to that of the two species next to be described. *C. Nipalensis* has a large and rather strong bill compared with those of the others.

Hab. Nepal and Sikkim.

IV.—*CERTHIA STOLICZKÆ*, n. sp.

This species, as far as the upper surface is concerned, resembles *C. Nipalensis*, but the bill is much shorter and weaker. The chin and throat are fulvous, and breast warm buff, increasing in rufous tone to the flanks and lower tail coverts, which are bright rusty brown. The rump and upper tail coverts, as in *C. Nipalensis*, are bright rusty brown, even brighter perhaps than in that species; but the colour of the tail feathers is less rufous, particularly so as regards the shafts of the feathers. The long claws, especially those of the anterior toes, and the large foot, are noticeable in this new species; in fact, it could almost be separated by the foot alone. Sometimes its throat alone is nearly white, but from this point the fulvous tone covers the lower surface.

I have much pleasure in naming it after my friend Dr. Stoliczka, to whom Indian naturalists are so much indebted.

Hab. Sikkim.

V.—*CERTHIA MANDELLII*, n. sp.\*

A bird of similar dimensions to the last, but with a longer and more curved bill, and smaller feet and claws.

The throat and breast are bright silky white; abdomen and sides tinged with brown, and flanks slightly washed with rusty; lower tail coverts pale rusty brown; upper tail coverts, as in the last, bright rusty brown; tail plain brown with the shafts rather rufous. In the colour of the tail being less rufous, this bird differs much from the last. Its principal characteristics are, however, the pure white breast, instead of the buff one of the last species, while the upper surface of the bird is very similar.

One of the eight specimens differs notably from all the others, by having a warm rosy tinge suffusing the white of the breast and throat. I do not, however, think this sufficient ground upon which to make a new species, and will not, therefore, name it provisionally; but will leave this to any one who will take the trouble to investigate the creepers further than I have done. The present species is named after Mr. Mandelli who sent me the two new species I have just described, and who placed all the creepers in his collection at my service.

Hab. Sikkim.

In examining examples of this genus, care is necessary to keep the long loose feathers in their proper places. The rufous feathers of the rump often

\* This species is probably the "*Certhia Nipalensis*" of Jerdon's Birds of India; as the "lower parts" of the last are not "pure white."







